DEGER ENERGIE
SOLAR TRACKING SYSTEMS

Assembly Instruction

DEGER**traker** 3000NT
DEGER**traker** 3000HD
DEGER**traker** 5000NT
DEGER**traker** 5000HD
DEGER**traker** 7000NT
DEGER**traker** 9000NT

Effective 2010-06-22

Assembly Instruction DEGERtraker

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IMPORTANT INSTRUCTIONS!!
Please pay attention to the instructions on Page I-1!!

Assembly Instruction DEGERtraker

Part I - Basics
Introduction

Congratulation for aquiring a DEGERtraker. You decided on a high quality dual-axis solar tracking system which can be used for all current photovoltaic solar modules.

Maximum solar yield:

Can be achieved with the DEGERtraker tracking system. By using the DEGERtraker tracking system, you are truly acknowledging the signs of the times: you are not only protecting our environment and nature but you are increasing your yield and thus achieving ROI sooner.

Maintenance-free. Long-life. Recyclable.

The systems designed to these exacting parameters are mass-produced in an ISO 9001-certified factory under environmentally sound conditions. DEGERtraker systems are truly 99.9% recyclable.
Compared with rigid systems, the amount of electronic scrap after useful life is 40% lower!

Quick installation.

Pre-assembled components with detailed instructions allow an installation within less than four hours (after the mast has been erected).

A technology to rely on.

The fact that the patent-protected control system and the utility model-protected mechanical system were awarded the inventor's prize of the federal state of Baden-Württemberg in South-Germany in 2000 shows that the DEGERtraker meets the demands of both experts and investors.
Since this award the control unit and the mechanical system have been improved continuously. The design of the DEGERtrakers is done according to DIN 1055-4 (3/2005) with independent certification.

Scope of delivery.

Complete dual-axis tracking system, mast, aluminium solar module carrier system to fit the respective module type, DEGERconecter control electronics with energy converter for extremely economical operation, foundation plan and this assembly instructions.

IMPORTANT INSTRUCTIONS!!

The start-up protocol (page VI-4) should be filled out on initial operation and faxed to the company DEGERenergie within 4 weeks of start-up. The entitlement to warranty claims for material defects will be only extended from the statutory two-year period warranty to 5 years if this protocol is submitted within the specified timeframe.

A fault report (page VII-4) must be submitted in order to process complaints. Complaints cannot be processed if fault reports have not been filled out correctly!! (the serial number of the defect system must be included in the report)

Assembly Instruction DEGERtraker

Part I - Basics
Security advices

The installed DEGERtraker tracking system has to be protected against trespassing in its whole sphere of action by adapted measures, for example by erecting a fence.

While assemblage of the DEGERtraker or parts of the system and while the system is put into operation some risks of injury exist caused by moveable parts of the tracking system. To protect injuries caused by possibly existing burrs or sharp angles we imperatively recommend to wear gloves when mounting the steel parts of the system.

In case of checks or changes at the DEGERtraker all parts of the system have to be free of potential. Zero-potential and mechanical protection have to be proven and guaranteed due to the “Allgemeinen Regeln zur Unfallverhütung”. When voltage supply is indispensable for checking the system injuries of persons have to be ruled out by adapted actions.

Lightning protection and earthing have to be achieved due to DIN VDE 0185 or 0100 as with all photovoltaic systems.

The whole sphere of action has to be free of any objects.

Elevation-axle and azimuth-axle of the DEGERtraker can be moved manually by the enclosed Central Control Box (CCB). Therefore please pay attention to part V of this assembly instruction.
To move the traker safely in the horizontal position in case of power failure we recommend to use a uninterruptible power supply. When all electrical components fail the systems can be moved into the horizontal position by using standard tools. (see III-6)

The development of the DEGERtrakers is based on the DIN 1055-4. Reducing the module surface the system will be able to resist higher demands than the values given in the norm. The maximum mountable module surface depends on regional conditions and regulations. To calculate the maximum mountable module surface a dimensioning-tool is available on our website. The download of the dimensioning-tool is free.

DEGERtrakers can also be set up in earthquake endangered zones without reservation in respect of module area or foundations geometry.

In case of accumulation of snow on the module surface with more than 35kg/m² it is necessary to broach the module surface. It is possible to do this by activating manually the CCB as described above.

Intended Use

A DEGERtraker is designed and dimensioned to be applied with standard-photovoltaic modules and is therefore not adapted to be applied with concentrator modules, mirrors, solar thermal collectors etc. The maximum mountable module surface calculated by the dimensioning-tool must not be exceeded in any case. As soon as the modules are mounted an operating windguard has to be assembled or the module surface has to stay in the horizontal position.

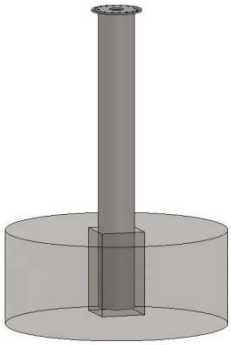
Permissible ambient temperature:	-20°C to +55°C	
Sound level:	Distance 10m:	40 dB(A)
	Distance 20m:	no difference to the sound level of the surrounding measurable
	Reference value:	
	40 dB(A) corresponds to:	- tweet of a bird - usual background sound level in a house

Assembly Instruction DEGERtraker

Part I - Basics
Short assembly instruction

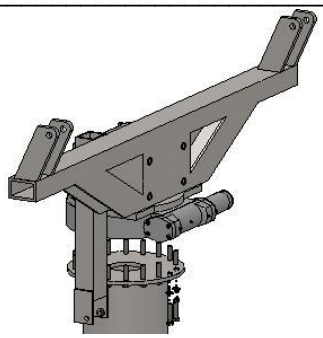
1st step

Assembly of foundation and mast



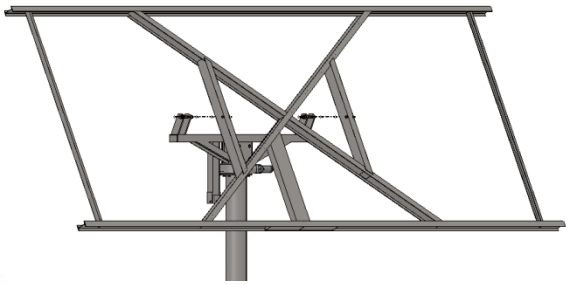
2nd step

Assembly of integrated motor east west



3rd step

Assembly of base frame

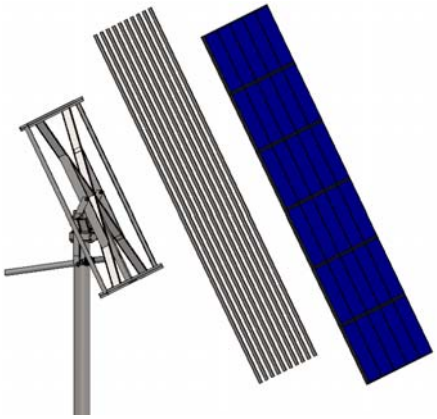


4th step

Assembly of Elevation motor

5th step

Assembly of modules and control unit



Assembly Instruction
DEGERtraker

Part I - Basics
Scope of delivery

1300001	DEGERtraker 3000NT			No
A-Nr.	Name of item		pc	
	Mast		1	1
8100041	Rotating head 3000NT		1	2
8100017	Base frame 3000NT		1	3
4100038	Elevation-motor EMO V		1	4
8100036	Boltpack rotating head		1	5
6800003	Tread locking fluid 5g		1	6
8100034	Boomerang II 3000NT		1	7
8910	Assembly instruction		1	8
5100010	Energy converter V		1	9
	Aluminium profiles F-Set-HD		*	10
				11
6900003	Sliding nut M 10, 30x20x6	Alu/Base frame	*	12
				13
6100005	Bolt M 10x140	Alu/Base	*	14
6900010	Clamp M TH M 8-vz., Nova-Grip	Solar module	*	15
6900002	Sliding nut M 8 18x18x5	Solar module	*	16
6100001	Bolt M 8x30	Solar module	*	17
6900015	Clamp plate 25x6, 4x2	Solar module	*	18
	Bolt M 6	Solar module	*	19
6900001	Sliding nut M 6 18x18x5	Solar module	*	20

1310001	DEGERtraker 3000HD			
A-Nr.	Name of item		pc	
	Mast		1	1
8100048	Rotating head 3000HD		1	2
8100018	Base frame 3000HD		1	3
4100038	Elevation-motor EMO V		1	4
8100019	Boltpack rotating head		1	5
6800003	Tread locking fluid 5g		1	6
8100031	Boomerang II 3000HD		1	7
8910	Assembly instruction		1	8
5100010	Energy converter V		1	9
	Aluminium profiles F-Set-HD		*	10
				11
6900003	Sliding nut M 10, 30x20x6	Alu/Base frame	*	12
				13
6100005	Bolt M 10x140	Alu/Base	*	14
6900010	Clamp M TH M 8-vz., Nova-Grip	Solar module	*	15
6900002	Sliding nut M 8 18x18x5	Solar module	*	16
6100001	Bolt M 8x30	Solar module	*	17
6900015	Clamp plate 25x6, 4x2	Solar module	*	18
	Bolt M 6	Solar module	*	19
6900001	Sliding nut M 6 18x18x5	Solar module	*	20

1500001	DEGERtraker 5000NT			No
A-Nr.	Name of item		pc	
	Mast		1	1
8100005	Rotating head 5000NT		1	2
8100003	Base frame 5000NT		1	3
4100038	Elevation-motor EMO V		1	4
8100036	Boltpack rotating head		1	5
6800003	Tread locking fluid 5g		1	6
8100034	Boomerang II 5000NT		1	7
8910	Assembly instruction		1	8
5100010	Energy converter V		1	9
	Aluminium profiles F-Set-X		*	10
6900011	Clamp M TH M 10-vz. Nova-Grip	Alu/Base frame	*	11
6900003	Sliding nut M 10, 30x20x6	Alu/Base frame	*	12
6100020	Bolt M 10x35	Alu/Base frame	*	13
				14
6900010	Clamp M TH M 8-vz., Nova-Grip	Solar module	*	15
6900002	Sliding nut M 8 18x18x5	Solar module	*	16
6100001	Bolt M 8x30	Solar module	*	17
6900015	Clamp plate 25x6, 4x2	Solar module	*	18
	Bolt M 6	Solar module	*	19
6900001	Sliding nut M 6 18x18x5	Solar module	*	20

1510001	DEGERtraker 5000HD		
A-Nr.	Name of item		pc
	Mast		1
8100046	Rotating head 5000HD		1
8100027	Base frame 5000HD		1
4100039	Elevation-motor EMO HD		1
8100019	Boltpack rotating head		1
6800003	Tread locking fluid 5g		1
8100032	Boomerang II 5000HD		1
8910	Assembly instruction		1
5100010	Energy converter V		1
	Aluminium profiles F-Set-HD		*
6900011	Clamp M TH M 10-vz. Nova-Grip	Alu/Base frame	*
6900003	Sliding nut M 10, 30x20x6	Alu/Base frame	*
6100020	Bolt M 10x35	Alu/Base frame	*
6900010	Clamp M TH M 8-vz., Nova-Grip	Solar module	*
6900002	Sliding nut M 8 18x18x5	Solar module	*
6100001	Bolt M 8x30	Solar module	*
6900015	Clamp plate 25x6, 4x2	Solar module	*
	Bolt M 6	Solar module	*
6900001	Sliding nut M 6 18x18x5	Solar module	*

1700001	DEGERtraker 7000NT			Pos.
A-Nr.	Name of item		pc	
	Mast		1	1
8100006	Rotating head 7000NT		1	2
8100004	Base frame 7000NT		1	3
4100038	Elevation-motor EMO V		1	4
8100019	Boltpack rotating head		1	5
6800003	Tread locking fluid 5g		1	6
8100031	Boomerang II 7000NT		1	7
8910	Assembly instruction		1	8
5100010	Energy converter V		1	9
	Aluminium profiles F-Set-X		*	10
6900011	Clamp M TH M 10-vz. Nova-Grip	Alu/Base frame	*	11
6900003	Sliding nut M 10, 30x20x6	Alu/Base frame	*	12
6100020	Bolt M 10x35	Alu/Base frame	*	13
				14
6900010	Clamp M TH M 8-vz., Nova-Grip	Solar module	*	15
6900002	Sliding nut M 8 18x18x5	Solar module	*	16
6100001	Bolt M 8x30	Solar module	*	17
6900015	Clamp plate 25x6, 4x2	Solar module	*	18
	Bolt M 6	Solar module	*	19
6900001	Sliding nut M 6 18x18x5	Solar module	*	20

1900001	DEGERtraker 9000NT		
A-Nr.			pc
	Mast		1
8100046	Rotating head 9000NT		1
8100004	Base frame 9000NT		1
4100039	Elevation-motor EMO HD		1
8100019	Boltpack rotating head		1
6800003	Tread locking fluid 5g		1
8100032	Boomerang II 9000NT		1
8910	Assembly instruction		1
5100010	Energy converter V		1
	Aluminium profiles F-Set-HD		*
6900011	Clamp M TH M 10-vz. Nova-Grip	Alu/Base frame	*
6900003	Sliding nut M 10, 30x20x6	Alu/Base frame	*
6100020	Bolt M 10x35	Alu/Base frame	*
6900010	Clamp M TH M 8-vz., Nova-Grip	Solar module	*
6900002	Sliding nut M 8 18x18x5	Solar module	*
6100001	Bolt M 8x30	Solar module	*
6900015	Clamp plate 25x6, 4x2	Solar module	*
	Bolt M 6	Solar module	*
6900001	Sliding nut M 6 18x18x5	Solar module	*

Pos. 19 : For solar module high:

6100111	Bolt M 6x30	1mm - 18 mm
6100112	Bolt M 6x40	19 mm - 28 mm
6100113	Bolt M 6x50	29 mm - 38 mm
6100115	Bolt M 6x60	39 mm - 48 mm
6100116	Bolt M 6x70	49 mm - 58 mm

Optional :

1900003	Inverter holding plate 1200 mm
1900004	Inverter holding plate 900 mm
1900005	Inverter holding plate 600 mm

Pos. 10 - 20 * depending on amount and size of modules

Assembly Instruction
DEGERtraker

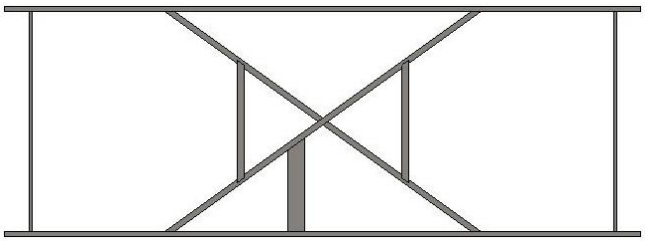
Part I - Basics
Scope of delivery

Pos. 1 : Mast

Pos. 2 : Rotating head

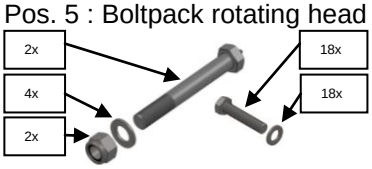
optional: Inverter holding plate

Pos. 3 : Base frame



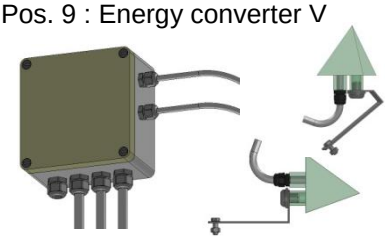
Pos. 4 :Elevation-motor EMO

Pos. 5 : Boltpack rotating head



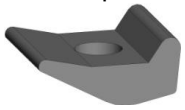
Pos. 7 Boomerang II

Pos. 9 : Energy converter V

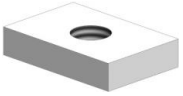


Pos. 10 : Aluminium profiles

Pos. 11: Clamp MTH M10



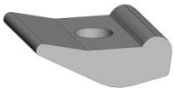
Pos 12: Sliding nut M10



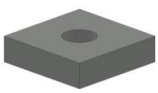
Pos. 13: Bolt M10x35

Pos. 14: Bolt M10x140

Pos. 15: Clamp MTH M8



Pos. 16: Sliding nut M8



Pos. 17: Bolt M8x30

Pos. 18: Clamp plate

Pos. 19: Bolt M6

Pos. 20: Sliding nut M6

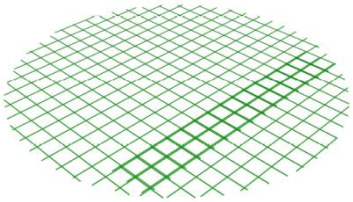
Assembly instructions DEGERtraker

Part II – Foundation and mast
Assembley foundation

A qualified professional must be commissioned with creating the foundation.
We recommend having the foundation reinforcement approved by a qualified engineer or technician before concreting.
The necessary bearing capacity of the subsoil is 200 kN/m². This value must be checked for correctness and documented by the site manager in charge. A substratum expert is to be called in if there is any uncertainty.
In regions and with soils at risk of frost, further measures must be taken to ensure frost protection, e.g. frost-proof sub-base or lean-mixed concrete fill down to the frost line.

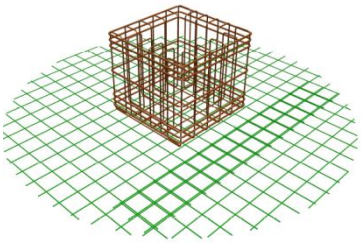
1st Step:

- Excavate top soil
- Insert conduit for cable (not in picture)
- Install formwork (see below for a suggestion for creating round formwork)
- (Foundation dimensions, see page II-4)
- Lay bottom layer of wire-mesh steel Q257A Item1 into the formwork (cut into the formwork)
- Insert a spacer to ensure minimum concrete coverage (5 cm).



2nd Step:

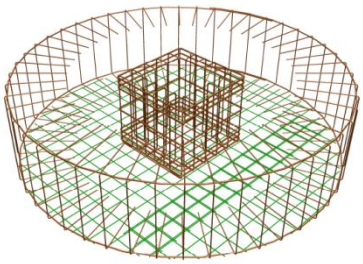
- Insert mast mount centrally (height approx.10 cm).
- Install bent bar-steel Items [2] and [3] into the center of the foundation, as shown.



ATTENTION: Conduit must be inside the mast

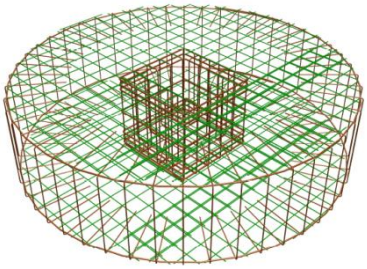
3rd Step:

- Install bent bar-steel Items [1] and [4] as shown.



4th Step:

- Install top layer of wire-mesh steel Q257A Item [1] as shown (cut into the formwork)

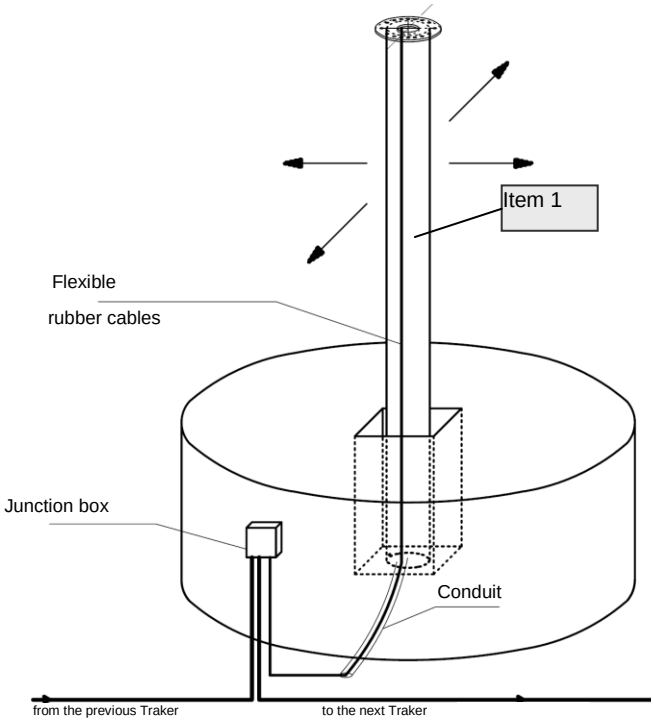


5th Step:

- Create formwork for the receiving part (40 x 40cm)
- Attach foundation formwork (suggestion: galvanized sheet steel)
- Affix foundation formwork in such a way that the formwork pressure generated by filling can be absorbed (suggestion: additional protection using truck lashing straps)
- Pour out and compact the foundation (without receiving part) using C20/30 concrete.

Assembly instructions DEGERtraker

Part II – Foundation and mast



6th Step:

- Insert mast into the foundation receiving part.**You do not have to take account of the location of the bores in the flange. ATTENTION: Conduit must be inside the mast**
- Align mast vertically
- Affix mast
- Concrete and compact **receiving part and column base** to the top edge of the foundation using grout concrete C25/30 (flowable)

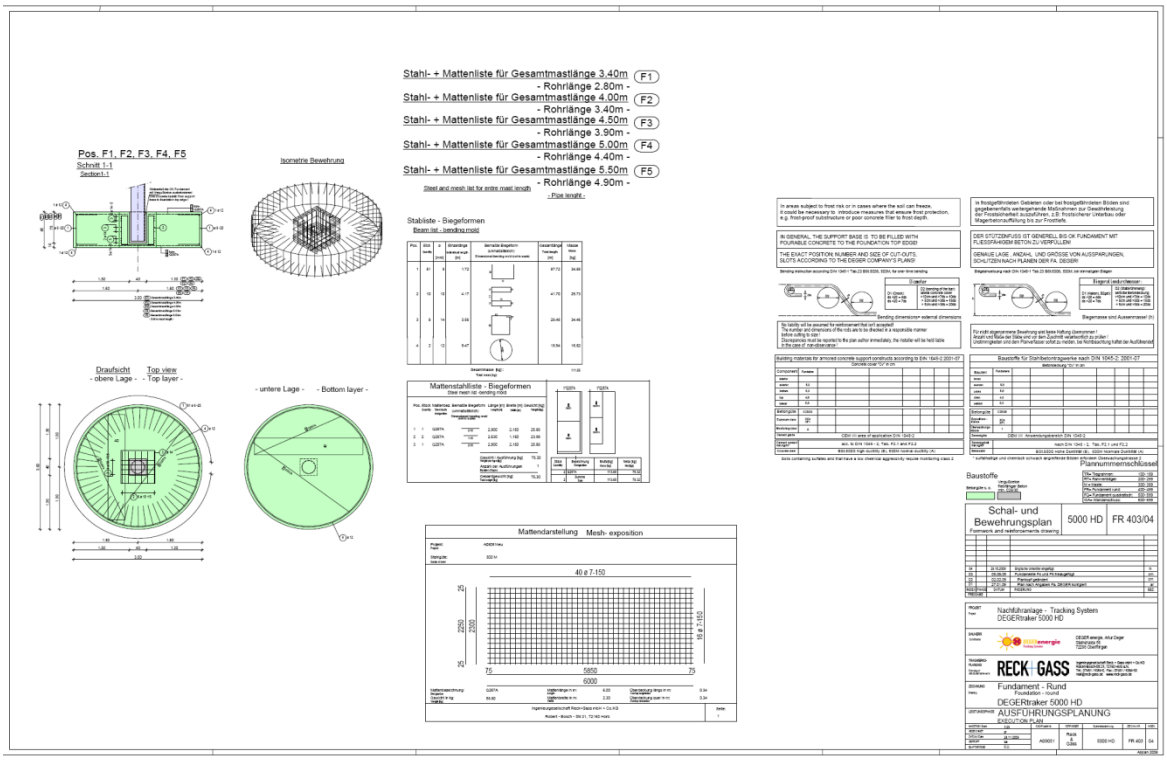
The concrete should be allowed to harden for at least 2 days before any further installation work is done!

ATTENTION! Cable guide

We recommend you attach a junction box to the side of the foundations, as shown in the adjacent drawing. The cables from the junction box to the rotating head must be designed as flexible rubber cables.

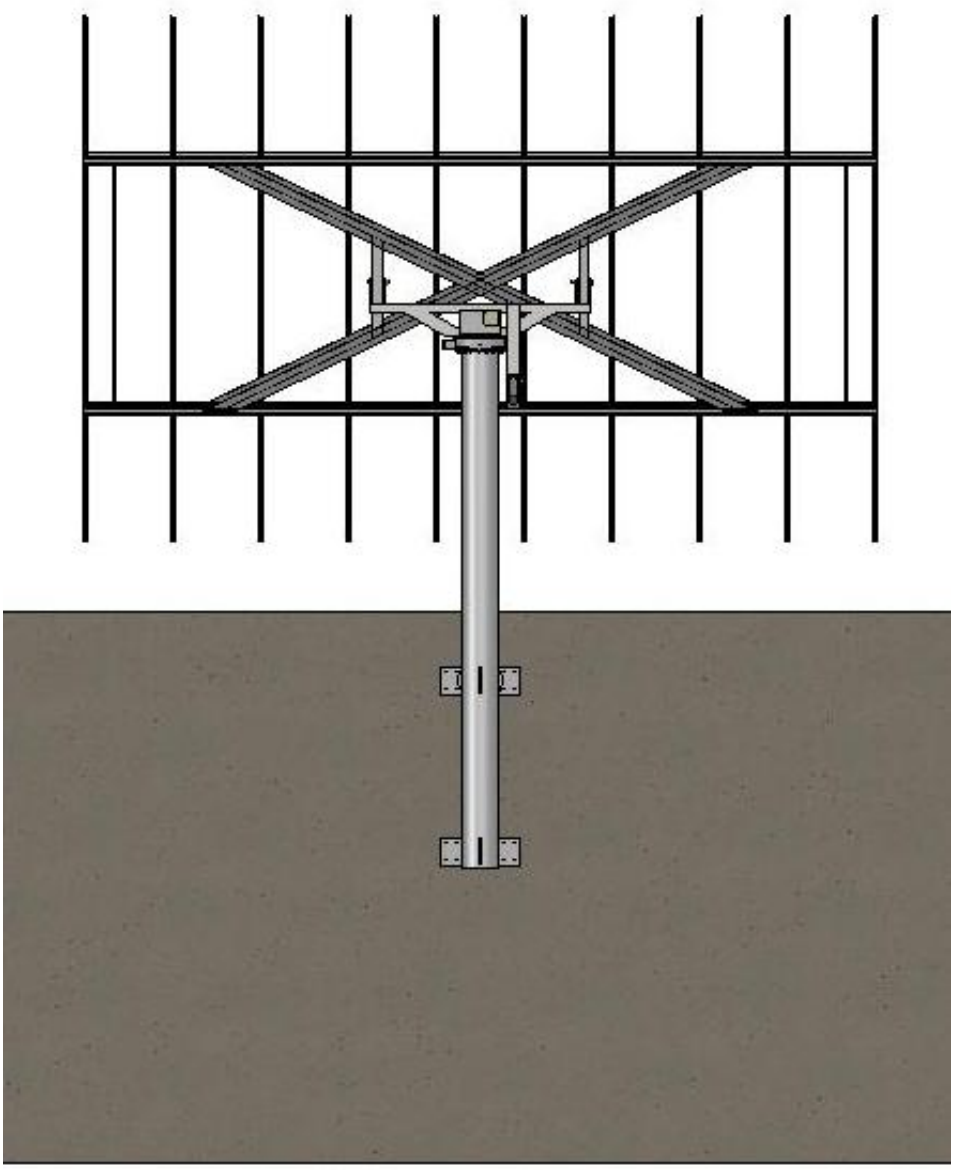
Formwork and reinforcement diagrams

A formwork and reinforcement diagram for the particular foundation, as shown below, can be obtained for each DEGERtraker on request – you must observe the instructions given in the diagrams! This diagram will be sent with the order confirmation. The diagram shown is only intended as a sample drawing.


Stahl- + Mattenliste für Gesamtmastlänge 3,40m - Rohrlänge 2.80m - F1
Stahl- + Mattenliste für Gesamtmastlänge 4,00m - Rohrlänge 3.40m - F2
Stahl- + Mattenliste für Gesamtmastlänge 4,50m - Rohrlänge 3.90m - F3
Stahl- + Mattenliste für Gesamtmastlänge 5,00m - Rohrlänge 4.40m - F4
Stahl- + Mattenliste für Gesamtmastlänge 5,50m - Rohrlänge 4.90m - F5
Pos. F1, F2, F3, F4, F5
Schnitt 1-1
Section 1-1
Isometrie Bewehrung
Stabliste - Biegeformen
Beam list - bending mold
Mattenstahlliste - Biegeformen
Draufsicht - obere Lage -
Top view - Top layer -
- unterer Lage -
- Bottom layer -
Mattendarstellung
Mesh- exposition
Schal- und Bewehrungsplan
Formwork and reinforcements drawing
5000 HD
FR 403/04
Baustoffe
Plannummernschlüssel
Nachführanlage - Tracking System
DEGERtraker 5000 HD
RECK+GASS
Fundament - Rund
Foundation - round
DEGERtraker 5000 HD
AUSFÜHRUNGSPLANUNG
EXECUTION PLAN

Part II – Foundation and mast
Assembly of the mast – building integrated

Example for mounting on concrete wall C20/25



It is necessary to dimension the mounting for every system separately according to the conditions on site.
The calculations are to be assigned to a local structural engineer who is responsible for the present building!

Assembly Instruction DEGERtraker

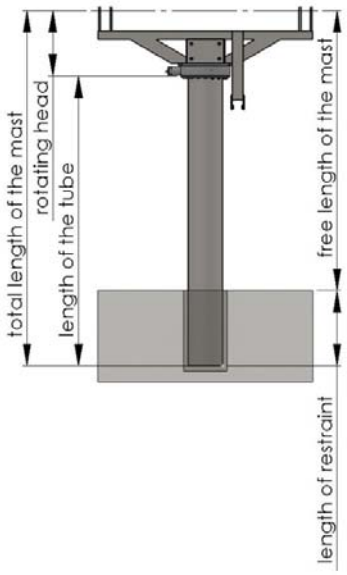
Part II – Foundation and mast Dimensions

DEGERtraker 3000NT

solarmodule area m²	total length of the mast m	fee length of the mast m	length of restraint m	mast cross section Ø / w all thickness mm	mast w eight kg	foundation dimensions round - cm	foundation dimensions square - cm
25	3,3	2,6	0,7	tube 219.1 x 7.1	110	Ø205x85	180x180x85
25	4,0	3,3	0,7	tube 219.1 x 8.0	151	Ø210x85	185x185x85
25	4,5	3,8	0,7	tube 219.1 x 8.8	187	Ø215x85	190x190x85
25	5,0	4,3	0,7	tube 219.1 x 10.0	236	Ø225x85	200x200x85
25	5,5	4,8	0,7	tube 219.1 x 11.0	285	Ø235x85	205x205x85

DEGERtraker 3000HD

solarmodule area m²	total length of the mast m	fee length of the mast m	length of restraint m	mast cross section Ø / w all thickness mm	mast w eight kg	foundation dimensions round - cm	foundation dimensions square - cm
25	3,3	2,6	0,7	tube 323.9 x 8.8	201	Ø200x85	180x180x85
25	4,0	3,3	0,7	tube 323.9 x 8.8	248	Ø215x85	190x190x85
25	4,5	3,8	0,7	tube 323.9 x 8.8	282	Ø225x85	200x200x85
25	5,0	4,3	0,7	tube 323.9 x 8.8	316	Ø225x85	200x200x85
25	5,5	4,8	0,7	tube 323.9 x 8.8	350	Ø225x85	200x200x85

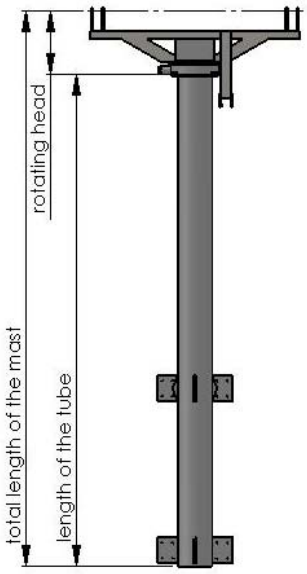


DEGERtraker 5000NT

solarmodule area m²	total length of the mast m	fee length of the mast m	length of restraint m	mast cross section Ø / w all thickness mm	mast w eight kg	foundation dimensions round - cm	foundation dimensions square - cm
40	3,3	2,6	0,7	tube 219.1 x 7.1	110	Ø230x85	200x200x85
40	4,0	3,3	0,7	tube 219.1 x 8.0	151	Ø250x85	220x220x85
40	4,5	3,8	0,7	tube 219.1 x 8.8	187	Ø280x85	240x240x85
40	5,0	4,3	0,7	tube 219.1 x 10.0	236	Ø300x85	260x260x85
40	5,5	4,8	0,7	tube 219.1 x 11.0	285	Ø310x85	270x270x85

DEGERtraker 5000HD

solarmodule area m²	total length of the mast m	fee length of the mast m	length of restraint m	mast cross section Ø / w all thickness mm	mast w eight kg	foundation dimensions round - cm	foundation dimensions square - cm
40	3,3	2,6	0,7	tube 323.9 x 8.8	205	Ø300x85	270x270x85
40	4,0	3,3	0,7	tube 323.9 x 8.8	254	Ø300x85	270x270x85
40	4,5	3,8	0,7	tube 323.9 x 8.8	288	Ø300x85	270x270x85
40	5,0	4,3	0,7	tube 323.9 x 8.8	322	Ø300x85	270x270x85
40	5,5	4,8	0,7	tube 323.9 x 8.8	356	Ø300x85	270x270x85



DEGERtraker 7000NT

solarmodule area m²	total length of the mast m	fee length of the mast m	length of restraint m	mast cross section Ø / w all thickness mm	mast w eight kg	foundation dimensions round - cm	foundation dimensions square - cm
60	3,3	2,6	0,7	tube 323.9 x 7.1	166	Ø280x85	280x280x85
60	4,0	3,3	0,7	tube 323.9 x 7.1	205	Ø290x85	290x290x85
60	4,5	3,8	0,7	tube 323.9 x 8.0	259	Ø300x85	300x300x85
60	5,0	4,3	0,7	tube 323.9 x 10.0	356	Ø320x85	320x320x85
60	5,5	4,8	0,7	tube 323.9 x 11.0	430	Ø330x85	330x330x85

DEGERtraker 9000NT

solarmodule area m²	total length of the mast m	fee length of the mast m	length of restraint m	mast cross section Ø / w all thickness mm	mast w eight kg	foundation dimensions round - cm	foundation dimensions square - cm
70	4,0	3,3	0,7	tube 323.9 x 7.1	205	Ø290x85	290x290x85
70	4,5	3,8	0,7	tube 323.9 x 8.0	259	Ø300x85	300x300x85
70	5,0	4,3	0,7	tube 323.9 x 10.0	356	Ø320x85	320x320x85

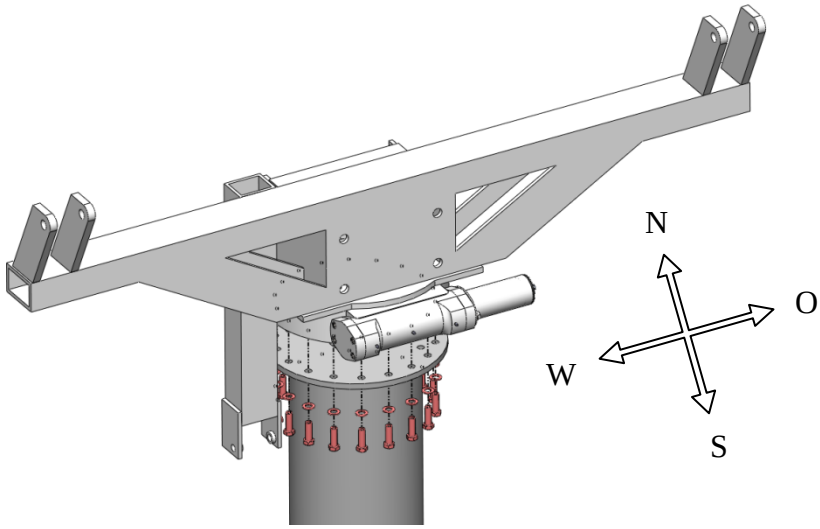
Assembly Instruction
DEGERtraker

Part III - Structure
Assembly integrated motor east-west and boomerang

1st step:

set rotating head onto the flange
on the top of the mast.

The drive unit should roughly point south
(+/- 30°) while being screwed tight.



2nd step:

screw rotating head with the flange by
using bolts M16x50 and washers M16.

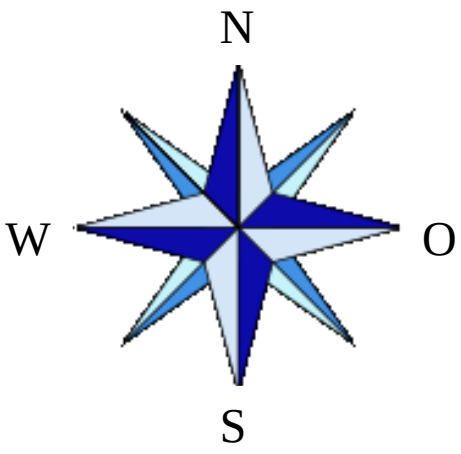
torque 200Nm

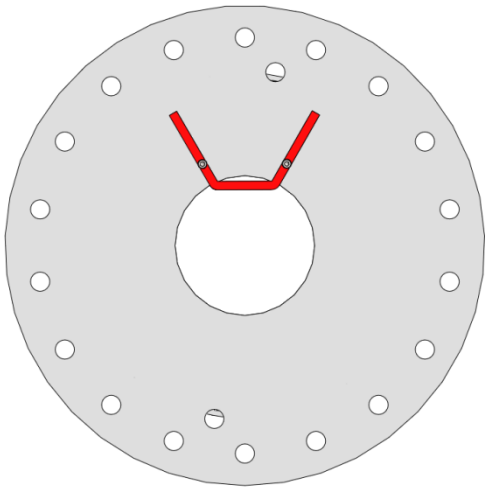
Weight of rotation head	
DEGERtraker 3000NT, 5000NT	132kg
DEGERtraker 3000HD, 5000HD, 7000NT, 9000NT	194kg

3rd step:

Mounting boomerang at the mast flange.

The tip of the “boomerang” must point in a southward direction (+/-3°). Use a GPS device or refer to the surveyor’s plan of the property to determine the south position. A compass is not precise enough.
As the boomerang is operating the end-limit-switch and with this the final position of the east-west-axis is set, an exact arrangement is necessary.
To determine south-direction for a proper arrangement of the tracking system a special document can be ordered.



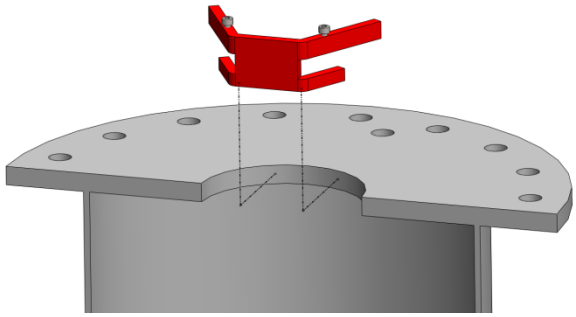


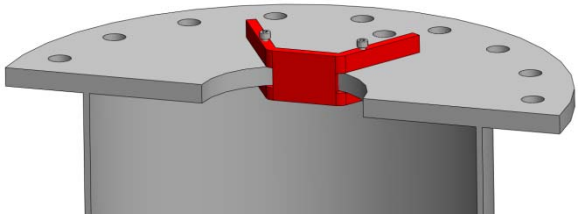
The position of the bore holes is irrelevant.

Assembly Instruction
DEGERtraker

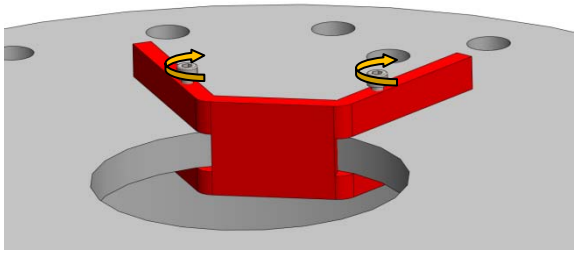
Part III – Structure
Assembly boomerang and limit switch

Push the boomerang as shown at the mast flange and fix it with the screws M5x18.





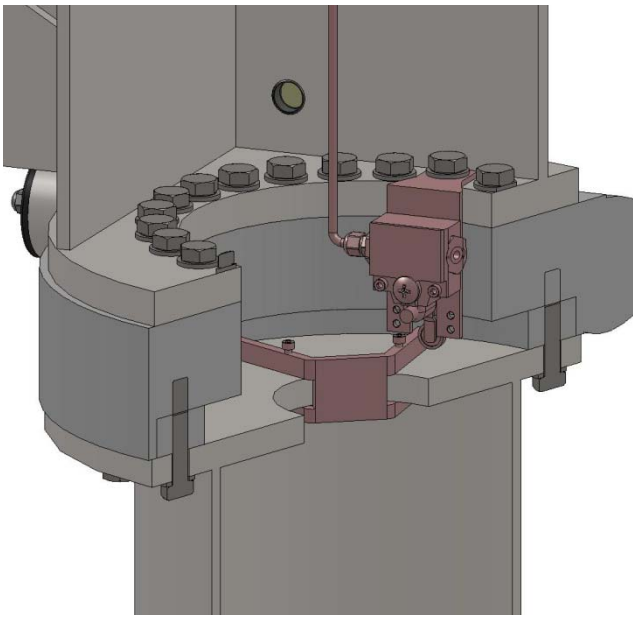
torque 6.5Nm

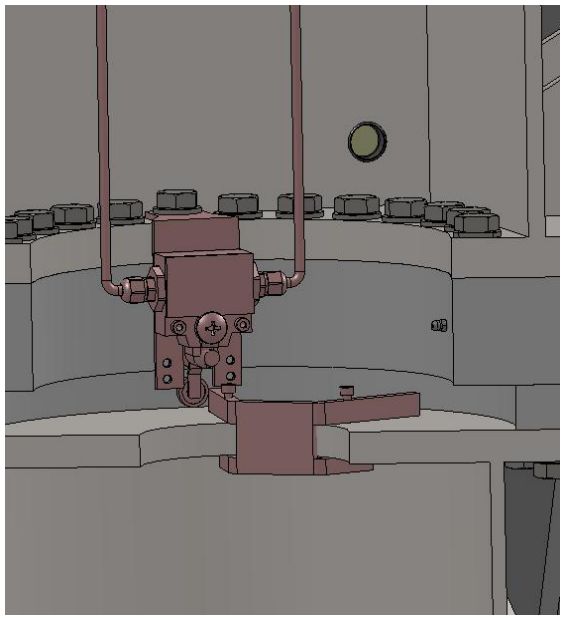


4th Step:

Attach the limit switch setting azimuth in the free bore on the rotating head.

Make sure that the switch flag terminals make contact upon operation of the boomerang and that the rotation movement is stopped.





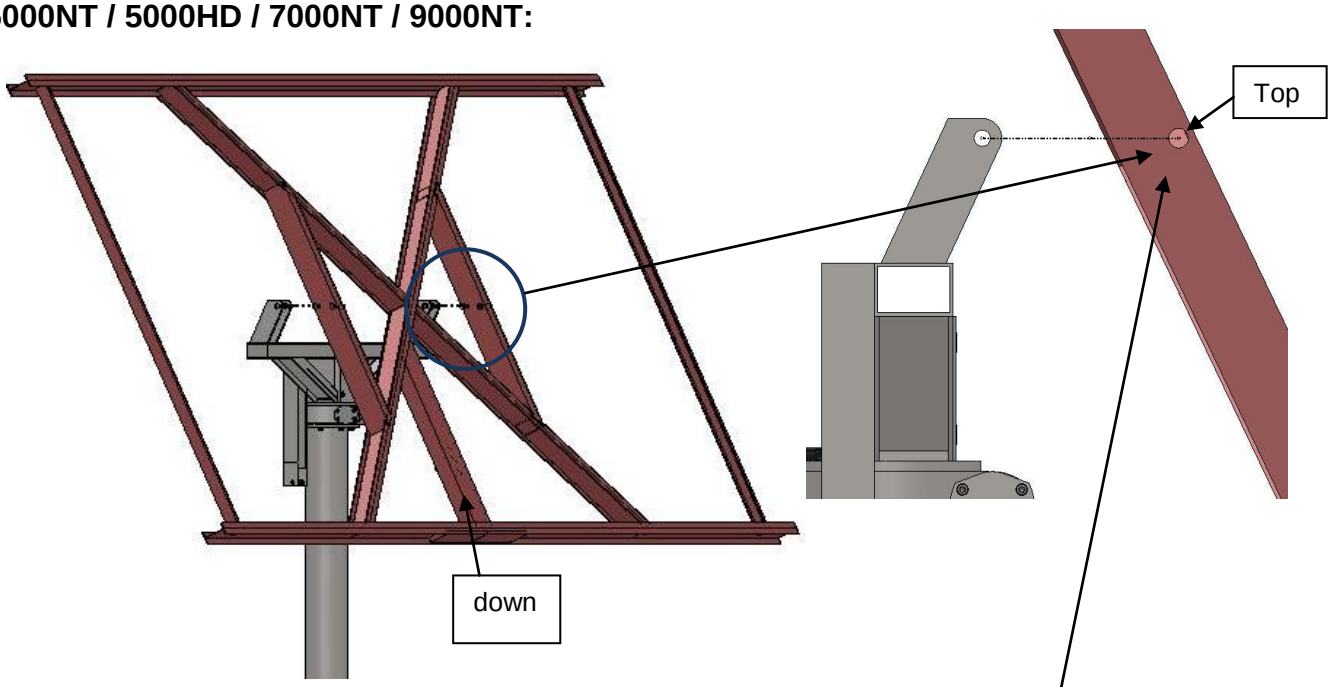
Assembly Instruction
DEGERtraker

Part III – Structure
Assembly base frame

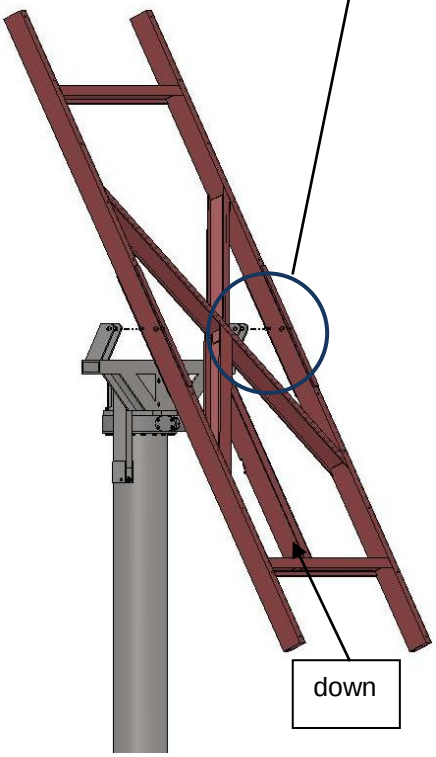
1st step:

Suspend the base frame by using a crane in such a way that the bore holes at the tip of rotation of the base frame are at the top and the connection for the Elevation motor (EMO) is on the left.

5000NT / 5000HD / 7000NT / 9000NT:



3000NT / 3000HD:



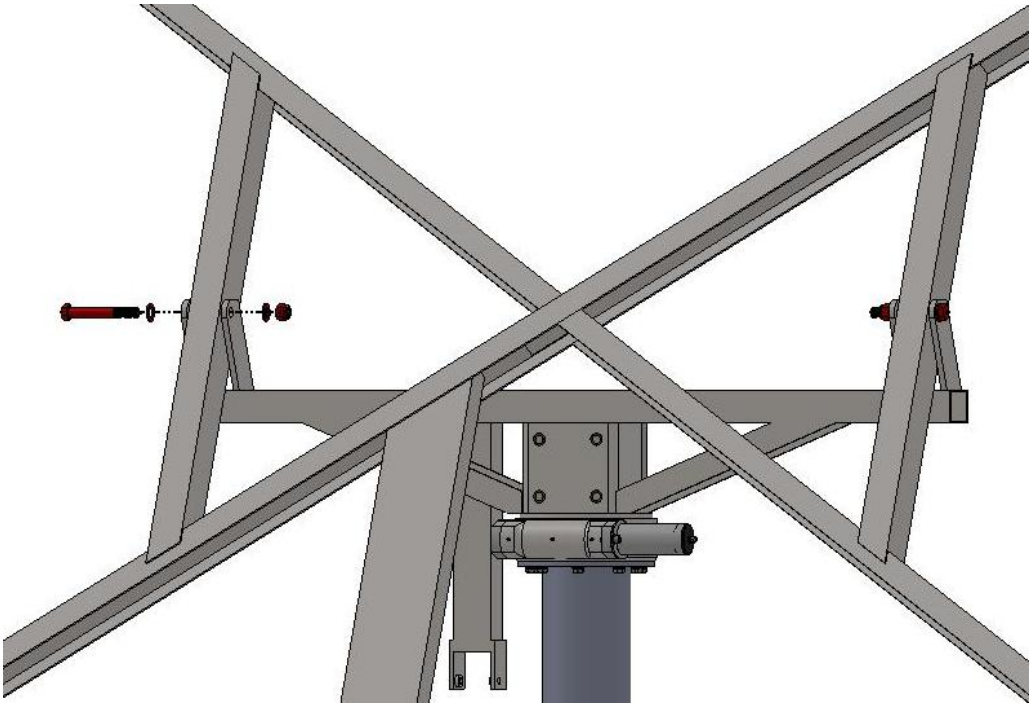
Weight of base frame

DEGERtraker 3000NT	**205 kg**
DEGERtraker 3000HD	**290 kg**
DEGERtraker 5000NT	**380 kg**
DEGERtraker 5000HD	**585 kg**
DEGERtraker 7000NT	**677 kg**
DEGERtraker 9000NT	**677 kg**

Part III – Structure
Assembly base frame

2nd step:

Built in bolt M24x180 with washer M24 and nut M24. Do not screw the bolts too tightly, to ensure that the shackles at the rotating head are not pressed together.



WARNING!!

Slide bearing bushings are installed at the rotation point of the base frame – these must be slightly lubricated in the initial installation. Later on lubrication is possible at any time through a lubricating nipple in the bolt M24x180. A list of suitable lubricants you find on page VII-3.

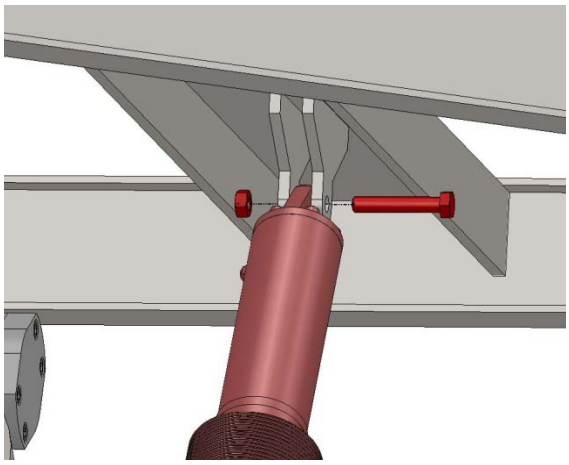
Mounting the modules on the base frame beforehand is **not permitted!!**

Assembly Instruction DEGERtraker

Part III – Structure
Assembly Elevation-Motor (EMO)

1st step:

Fix Elevation motor (EMO) at the base frame by using bolt M14x80 and nut M14



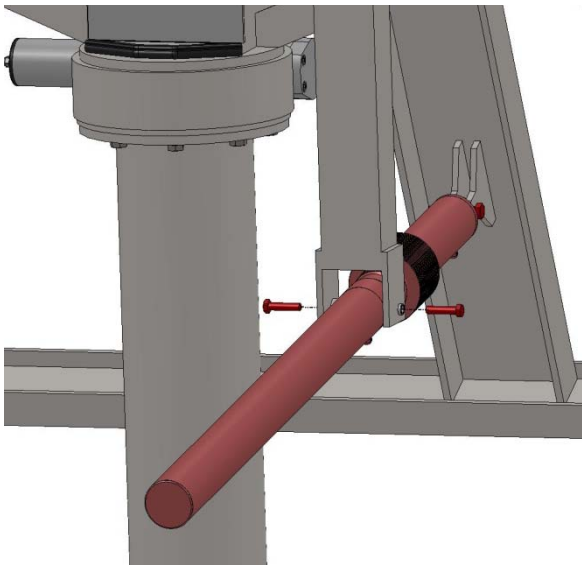
2nd step:

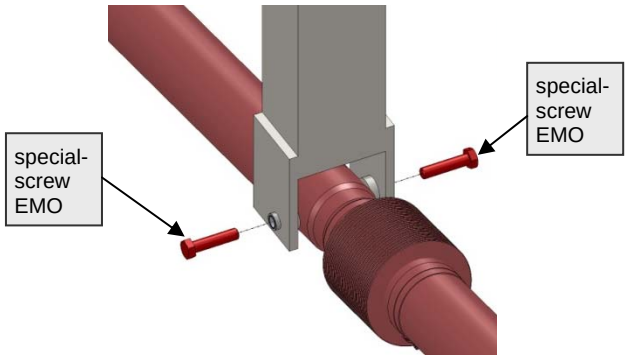
Fix Elevation motor at the rotation head by using the special screws EMO. Therefore the enclosed thread locking fluid has to be used. Tighten the special screws. **Torque: 35 Nm**.

- Do not use any other screws except those included in the delivery!
- Apply max. one drop of the locking fluid to the internal thread of the EMO.(see drawing beside)
- Ensure that **no** locking fluid enters into the sliding bearing connector!

The EMO is delivered with preset limit switches so no set up work has to be done at all.

Warning!!
The enclosed BEST-MK 1325 thread locking fluid must be used!!





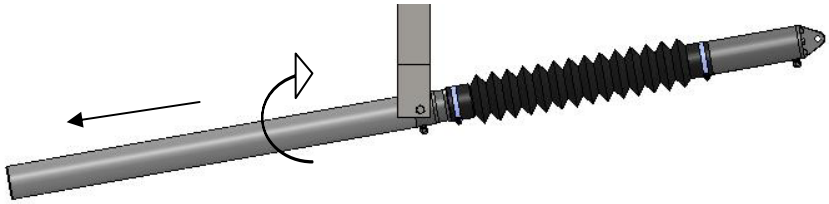
Assembly instruction DEGERtraker

Part III – Structure
Assembly Elevation-Motor (EMO)

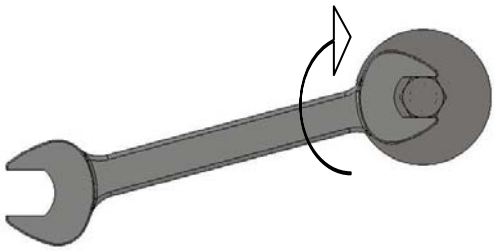
IMPORTANT: Disconnect the Elevation-Motor from the Energy-Converter by loosen clamp 1 and 2 before beginning with this work.

Manual operation:

When all electrical components fail the systems can be moved into the horizontal position by using standard tools.



For this the Aluminium-Cover at the lower side of the elevation motor has to be removed. After this apply a spanner wrench (size 17mm) at the hexagonal nut at the end of the elevation motor a turn clockwise.



Operating Instructions!!

The expansion bellows may not be pinched, blocked or compressed, since this can lead to damage to the internal parts.

A mechanical blockage of the movement of the piston rods is to be avoided since this can lead to damage to the drive system.

The linear actuator must come to a complete stop before changing the movement direction.

A fast reversal of the travel direction of the actuator (for example with the aid of the CCB) is not permitted.

Checking of the mechanics

Extend and retract the complete way of the drive, to guarantee that the mechanics moves freely, does not knock against anything and that the cables are long enoungh. Use a 12V or 24V batterie (for ex. suitable for a batterie-driven drill) for the head of the drive.

Assembly Instruction
DEGERtraker

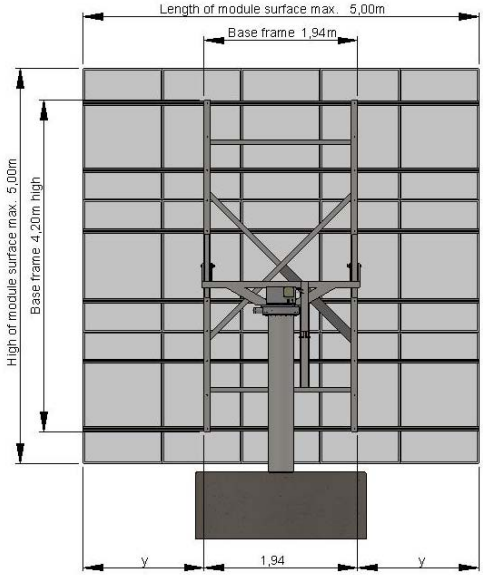
Part IV – Module carry system
DEGERtraker 3000NT / 3000HD

Module arrangement:

The following dimensions have to be abode and have to be reduced according to regional conditions if necessary:

- Module surface: **max. 25m²**
- length of Module surface: **max. 5.00m**
- height of Module surface: **max. 5.00m**

The total module area is to be determined relative to the site with the aid of the DEGERenergie dimensioning tool and may in no case be greater than 25m².



1st step: Arrangement of aluminium profiles:

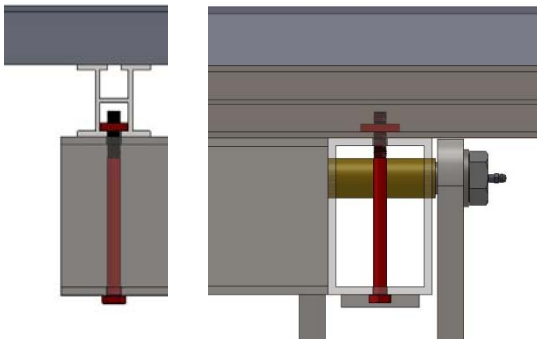
Following points have to be attended:

- in both axis modules have to be arranged symmetrically to the center of gravity
- 2 aluminium profiles for each row of modules
- attend the connecting socket on the backside of the modules

Overhang of the aluminium profile: **y** = (length of aluminium profile – 1.942m) / 2

2nd Step: Installation of aluminium profile F-SET-HD: (only for DEGERtraker 3000NT and 3000HD)

Insert screw M10x140 through existing bores; slide, align and fix Alu profile F-SET-X via the sliding nuts. The two screws are to be tightened with a **torque of 40NM.**



Assembly Instruction DEGERtraker

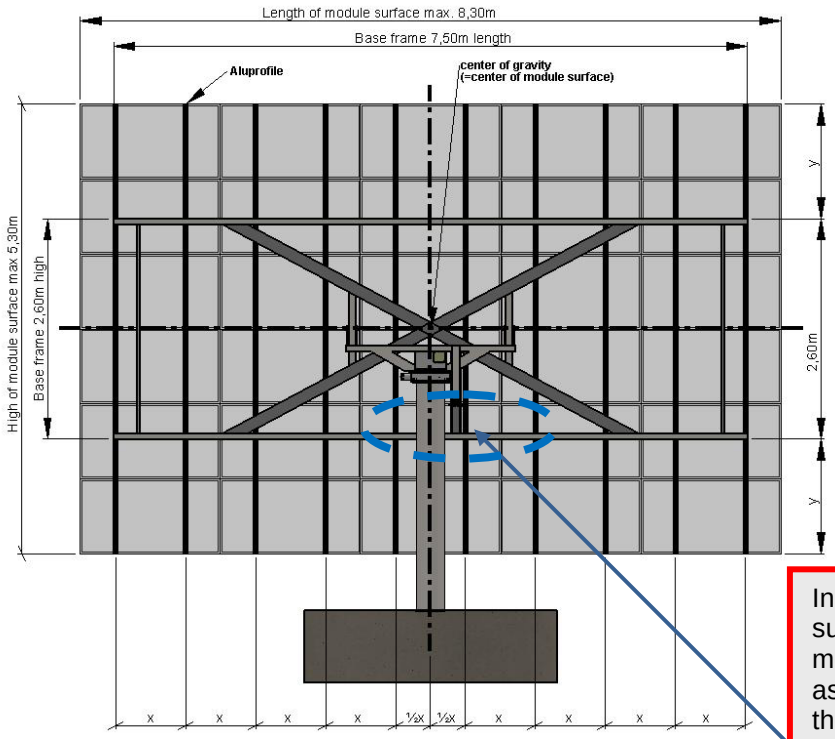
Part IV – Module carry system DEGERtraker 5000NT / 5000HD

Module arrangement:

The following dimensions have to be abode and have to be reduced according to regional conditions if necessary:

- Module surface: **max. 40m²**
- length of Module surface: **max. 8.30m**
- height of Module surface: **max. 5.30m**

The total module area is to be determined relative to the site with the aid of the DEGERenergie dimensioning tool and may in no case be greater than 40m².



In the range of the suspension for the elevation motor it is not possible to assemble the MTH-clamps at the outside of the base frame. Here the MTH-clamps have to be assembled at the inside of the base frame. Please pay attention to notes in step 2!

1st step: Arrangement of aluminium profiles:

Following points have to be attended:

- in both axis modules have to be arranged symmetrically to the center of gravity
- 2 aluminium profiles for each row of modules
- attend the connecting socket on the backside of the modules

Distance between 2 aluminium profiles: **x** = width of module / 2

Overhang of the aluminium profile: **y** = (length of aluminium profile - 2.60m) / 2

2nd step: Assembly of aluminium profiles see Page IV-5 !

Assembly Instruction DEGERtraker

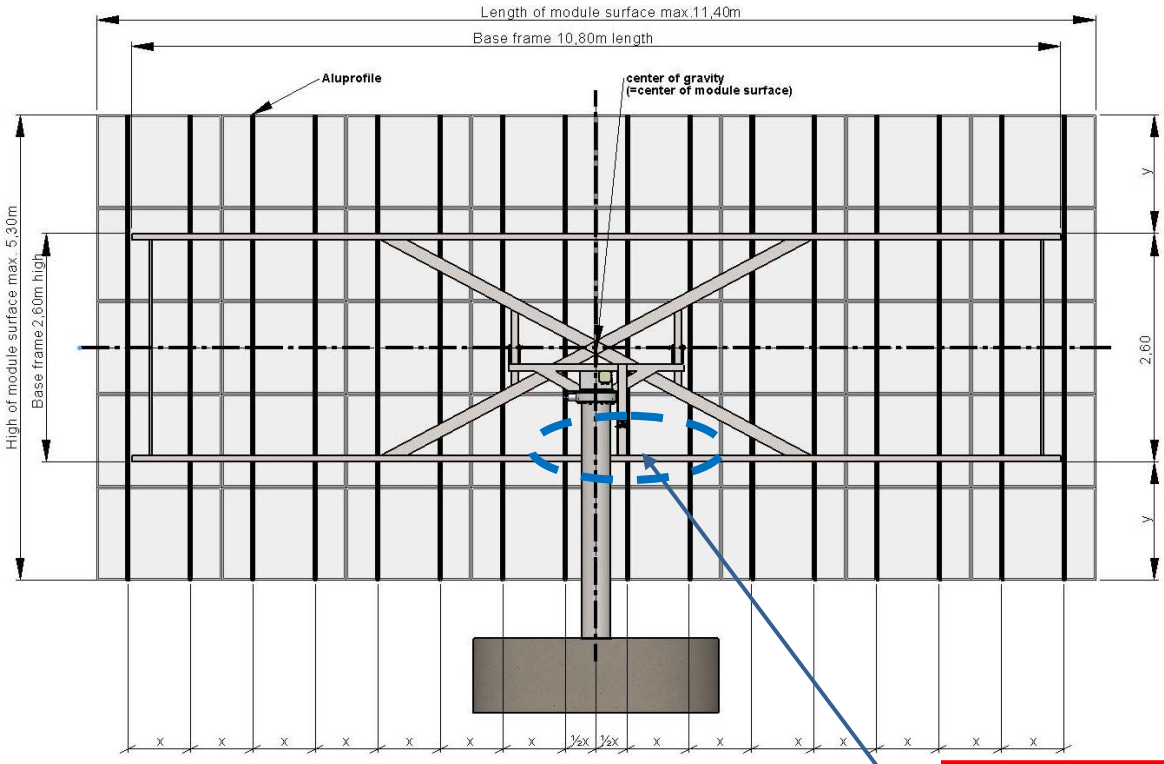
Part IV – Module carry system DEGERtraker 7000NT

Module arrangement:

The following dimensions have to be abode and have to be reduced according to regional conditions if necessary:

- Module surface: **max. 60m²**
- length of Module surface: **max. 11.40m**
- height of Module surface: **max. 5.30m**

The total module area is to be determined relative to the site with the aid of the DEGERenergie dimensioning tool and may in no case be greater than 60m².



In the range of the suspension for the elevation motor it is not possible to assemble the MTH-clamps at the outside of the base frame. Here the MTH-clamps have to be assembled at the inside of the base frame. Please pay attention to notes in step 2!

1st step: Arrangement of aluminium profiles:

Following points have to be attended:

- in both axis modules have to be arranged symmetrically to the center of gravity
- 2 aluminium profiles for each row of modules
- attend the connecting socket on the backside of the modules

Distance between 2 aluminium profiles: **x** = width of module / 2

Overhang of the aluminium profile: **y** = (length of aluminium profile - 2.60m) / 2

2nd step: Assembly of aluminium profiles see Page IV-5!

Assembly Instruction DEGERtraker

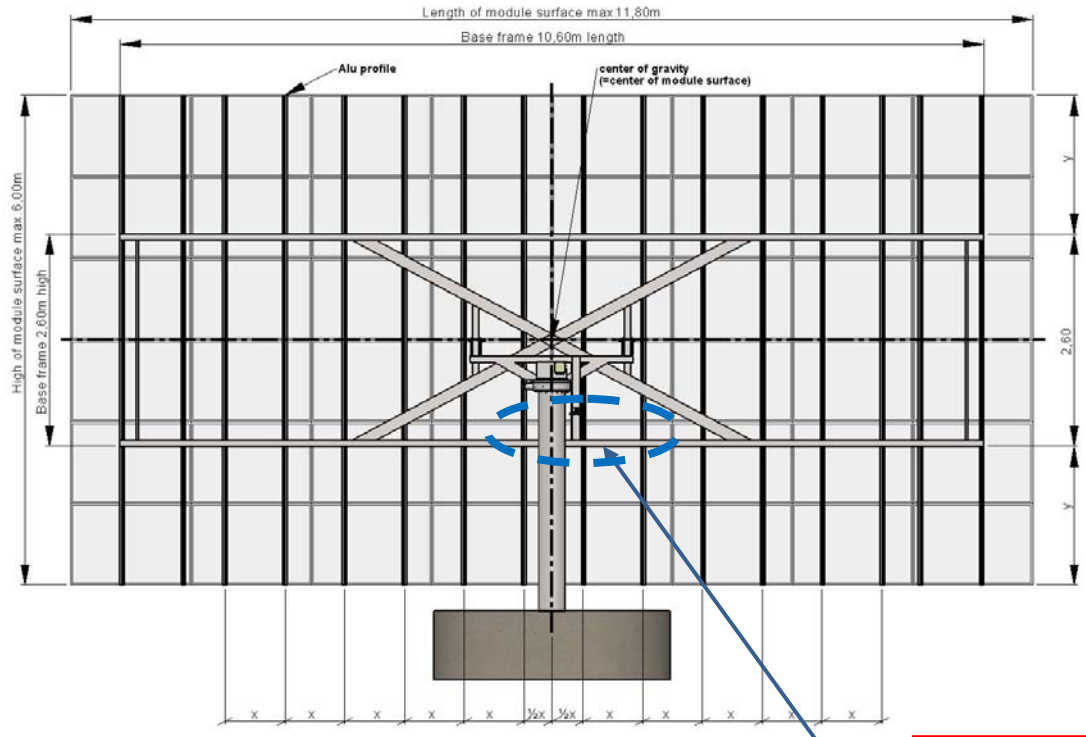
Part IV – Module carry system DEGERtraker 9000NT

Module arrangement:

The following dimensions have to be abode and have to be reduced according to regional conditions if necessary:

- Module surface: **max. 70m²**
- length of Module surface: **max. 11.80m**
- height of Module surface: **max. 6.00m**

The total module area is to be determined relative to the site with the aid of the DEGERenergie dimensioning tool and may in no case be greater than 70m².



In the range of the suspension for the elevation motor it is not possible to assemble the MTH-clamps at the outside of the base frame. Here the MTH-clamps have to be assembled at the inside of the base frame. Please pay attention to notes in step 2!

1st step: Arrangement of aluminium profiles:

Following points have to be attended:

- in both axis modules have to be arranged symmetrically to the center of gravity
- 2 aluminium profiles for each row of modules
- attend the connecting socket on the backside of the modules

Distance between 2 aluminium profiles: **x** = width of module / 2

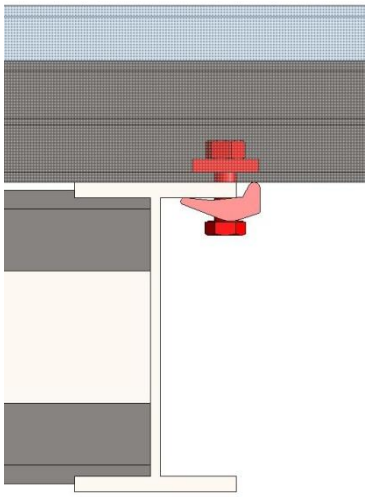
Overhang of the aluminium profile: **y** = (length of aluminium profile - 2.60m) / 2

2nd step: Assembly of aluminium profiles see Page IV-5 !

Part IV – Module carry system
Assembly of aluminium profiles and the modules

2nd step: Assembly of aluminium profiles
(DEGERtraker 5000NT, 5000HD, 7000NT and 9000NT)

Assemble aluminium profile **on both sides at the outside** of the base frame by using clamp MTH, bolt M 10 x 35 and sliding nut M10. In the range of the suspension for the elevation motor it is not possible to assemble the MTH-clamps at the outside of the base frame. Here the MTH-clamps have to be assembled at the inside of the base frame.



torque: 35NM

The clamp MTH has to slide along inside the aluminium profile towards the base frame until the bolt contacts the base frame

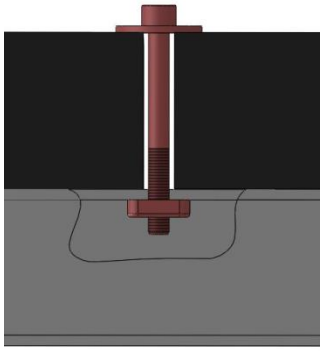
Tip:
Bring the DEGERtraker in a horizontal position – then it will be easier to mount the moduls

ATTENTION:

Extend and retract the complete way of the drive, to guarantee that the mechanics move freely, don't knock against anything and that the cables are long enough.

3rd step: Assembly of the modules
Between the modules

Assemble modules on the aluminium profiles by using bolt M6, clamp plate and sliding nut M6. Please pay attention that there is a gap of max 7mm between the modules.



WARNING!!

We strongly recommend that a gap of approximately 2 mm be left between the individual module rows.

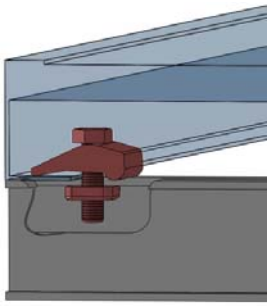
Assembly Instruction DEGERtraker

Part IV – Module carry system
Assembly of the module

At the end of the module-surface

Assemble modules on the alumnium profiles by using clamp MTH, bolt M8x30 and sliding nut M8

torque: 18NM



WARNING!

The total module area is to be determined relative to the site with the aid of the DEGERenergie dimensioning tool and may in no case exceed the maximum allowable total module surface.

Maximum total module surface

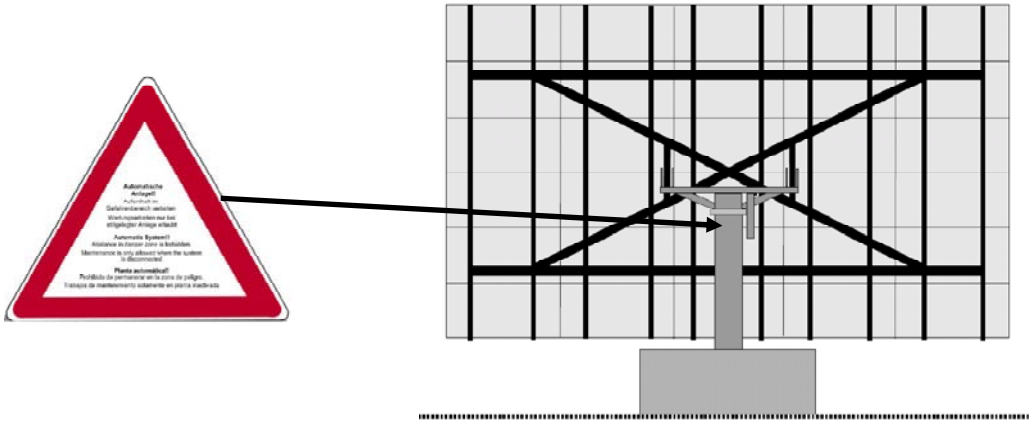
DEGERtraker 3000NT / 3000HD:	**25m²**
DEGERtraker 5000NT / 5000HD:	**40m²**
DEGERtraker 7000NT:	**60m²**
DEGERtraker 9000NT:	**70m²**

Defects resulting from a too large module surface are not covered by the warranty. As soon as the solar modules are installed you have to install a functioning windguardt or the module surface has to stay in a horizontal position. Because the elevation motor is not completely self-locking, it is possible that the module surface can move to a steeper position in strong winds. In order to avoid this situation, the motor connections should be kept short. It is recommended that the module surface position be inspected on a daily basis until commissioning is finalized!

Assembly of the modules is permitted only on the already-assembled base frame.
Module assembly beforehand is not permitted.

AFFIX WARNING NOTICE

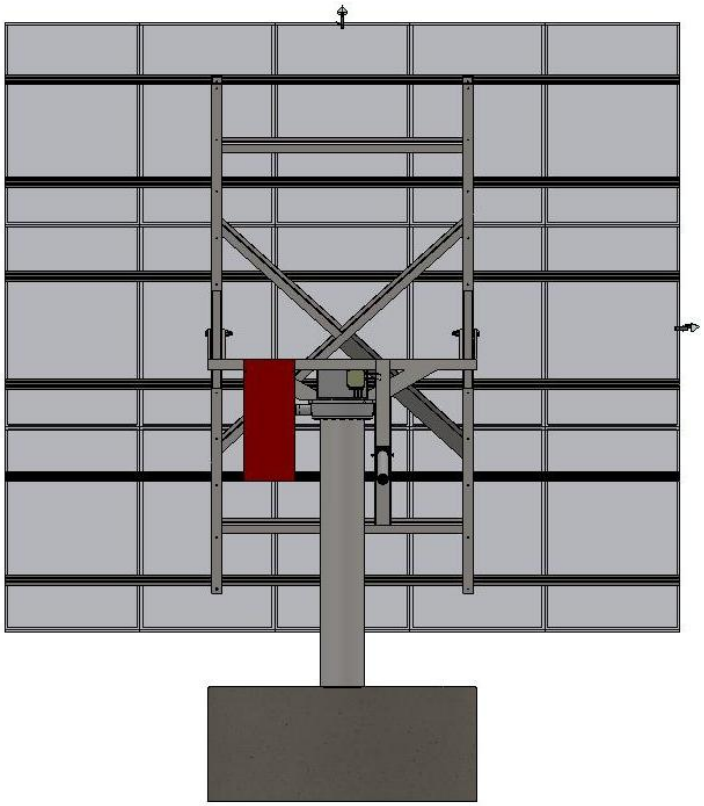
The delivered warning notice has to be affixed to the mast of every system well observeable.



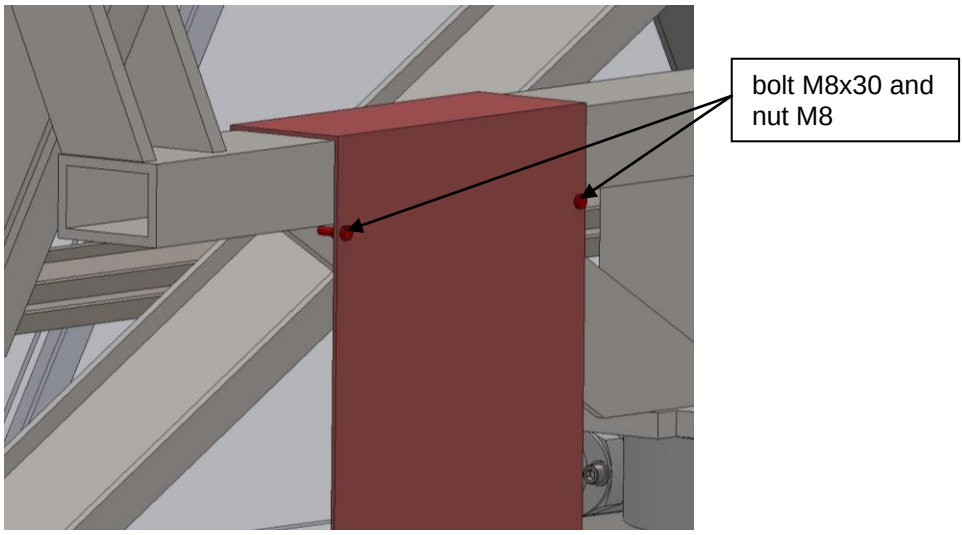
Part IV – Module carry system
Assembly inverter holding plate (optional)

Assembly inverter holding plate
(optional)**:**

Hang up the inverter holding plate directly at the traverse of the rotating head



Save the plate against lift-off by using bolts M8x30 and nut M8.

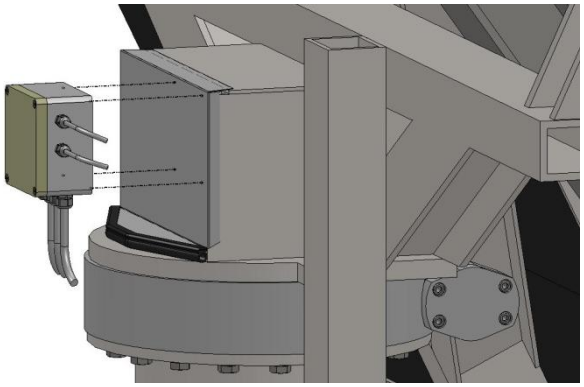


Assembly Instruction DEGERtraker

Part V – Control unit
Assembly control unit

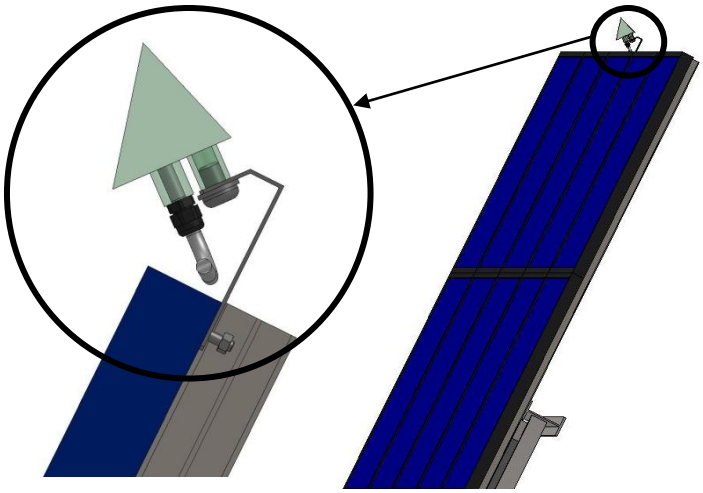
1st step: Fixing energy converter

Fix the energy converter at the cover of gear casing of the rotating head by using the provided screws M3.9 x 13. Therefore prefabricated holes are in the cover.



2nd step: Controling the east-west axis

Mount the DEGER**conecter** with the inscription ‘Ost-West pointing **UPWARDS** above the solar module surface.

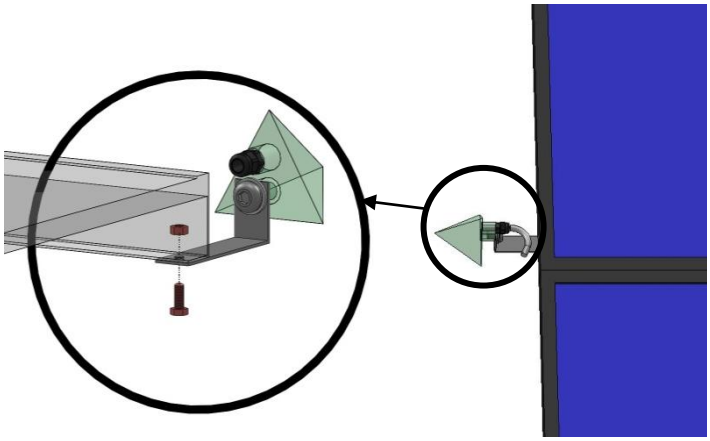


Connect the cable of the azimut-actuator (drive motor east-west)
blue cable connection 3
brown cable connection 4

Function test:
Check if the drive rotates the module surface towards the brightest spot in the sky. If you are not sure, you can cover a sensor cell at the DEGER**conecter** with your hand – now the module surface should rotate in the direction of the non-covered sensor cell.
Otherwise change connection 3 / 4

3rd step:
Controlling the elevation axis

Mount the DEGER**conecter** with the inscription ‘elevation’ **LATERALLY** at the solar module surface. (left side; seen from the front side)



Connect the cable of the elevation-actuator (drive motor for elevation)
blue cable connection 1
brown cable connection 2

Function test:
Check if the drive rotates the module surface towards the brightest spot in the sky. When the sky is cloudy the control will move the module surface into the horizontal. In this case, too, if you are not sure, you can cover a sensor cell at the DEGER**conecter** – then the module surface should rotate in the direction of the non-covered sensor cell. Otherwise change connection 1 / 2

Assembly Instruction
DEGERtraker

Part V – Control unit
Functional characteristics - arrangement check

A technology to rely on.

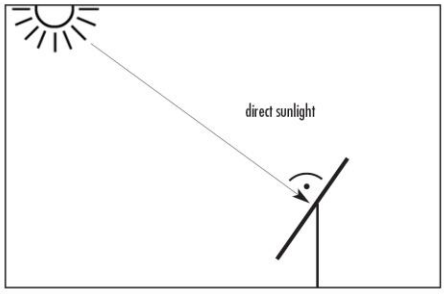
The fact that the patent-protected control system and the utility model-protected mechanical system were awarded the inventor's prize of the federal state of Baden-Württemberg in South-Germany in 2000 shows that the DEGER**traker** meets the demands of both experts and investors.

Functioning

The DEGER**conecter** control unit detects the brightest spot in the sky and adjusts the module surface's position to face it. The DEGER**traker's** mechanical system allows the accurate adjustment of the module surface to the sun all year round. **This technology also works in cloudy, rainy or foggy conditions.** If, for example, a day starts off sunny with clouds moving in from the west in the afternoon, the module surface will then move back slightly towards the east. On a completely overcast day, the module surface is adjusted to a horizontal position, or to face the point of the strongest irradiation. This allows to make the most out of adverse weather conditions.

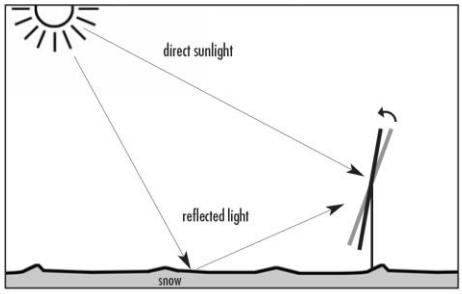
The control unit is designed to work preferably efficiently and only to do activities that cause a direct increment of the solar yield. In particular the system doesn`t move east globally at night but does this with the sunrise in the morning.

... with bright sunshine



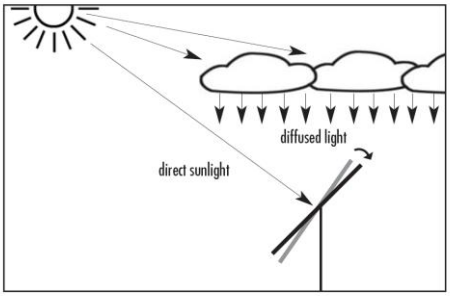
The DEGERtraker aligns itself with the brightest point in the sky.

... with a covering of snow and cloudless sky



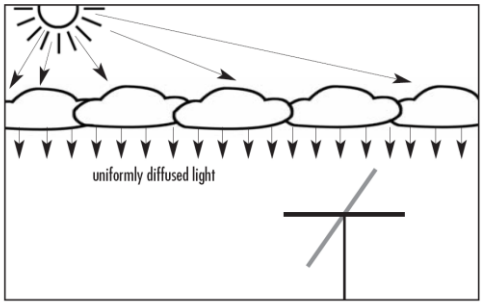
In addition to recognizing the sun, the DEGERconecter also recognizes reflected sunlight from a covering of snow. The DEGERtraker drives into that position, which can best take advantage of the sun's direct rays and its reflected light for energy recovery.

... with sunshine and thin or scattered clouds



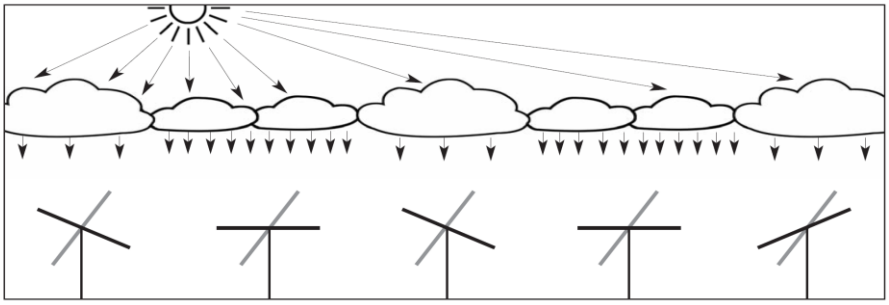
In addition to recognizing the sun, the DEGERconecter also recognizes other sources of light in the sky. The DEGERtraker drives into that position, which can best take advantage of the sun's direct rays and diffused light for energy recovery.

... with a uniformly overcast sky



The DEGERconecter recognizes the brightest point in the sky. Depending on the radiation, the DEGERtraker will drive partially or completely into a horizontal position.

... with clouds of differing thickness above a solar park with DEGERtrakers



Light conditions above solar parks where clouds of differing thickness are present can be different for each DEGERtraker. Individual control makes it possible for each DEGERtraker to be driven to its optimal position with respect to its brightest source of light, so that the greatest possible current yield is realized.

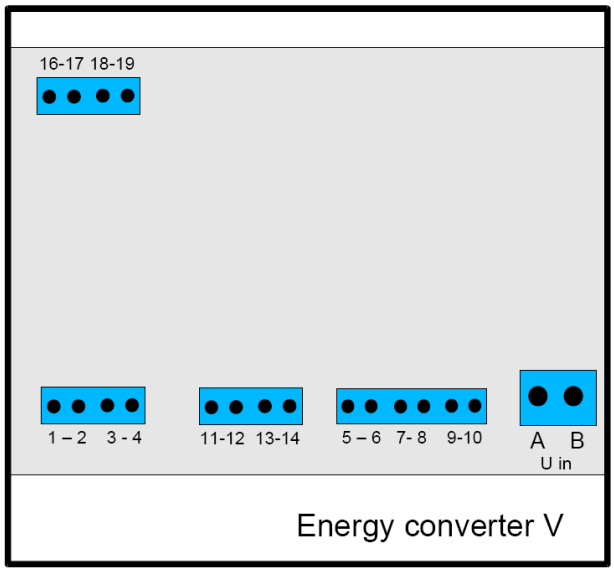
Assembly Instruction
DEGERtraker

Part V – Control unit
Data sheet energy converter V

Data sheet energy converter V

Power supply of the DEGER**conecter** and the drive

- **for power net feed systems of 80V...380V DC**
- **or 80...265V AC (Grid)**
- or for self-contained supply of the drives with an additional module



Pin assignment

A - B : Power supply polarity-independent
80 – 380V DC direct current or
80 - 265V AC alternating current

Attention: From a voltage of 120V and above, single-core double-insulated cables must be used!

1 - 2 : Connection for elevation motor
In case of wrong move direction – change connection 1-2

3 - 4 : Connection for east-west motor
In case of wrong move direction – change connection 3-4

Discription of further connecters

5 - 6 : Power supply to DEGERconecter elevation
5-plus-brown cable / 6-minus-white

7 - 8 : Power supply DEGERconecter east-west
7-plus-brown-cable / 8-minus-white-cable

9 - 10 : Input for self-contained supply of the tracking system with a module of 0.5-10Wp, 22-27V open circuit voltage

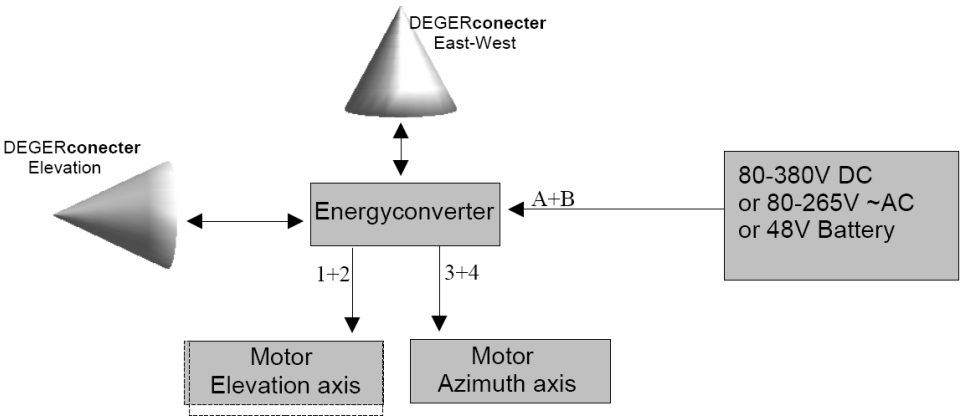
11-12: Output from DEGERconecter elevation
green cable-11 / yellow cable-12

13-14: Output fom DEGERconecter east-wset
geen cable-13 / yellow cable-14

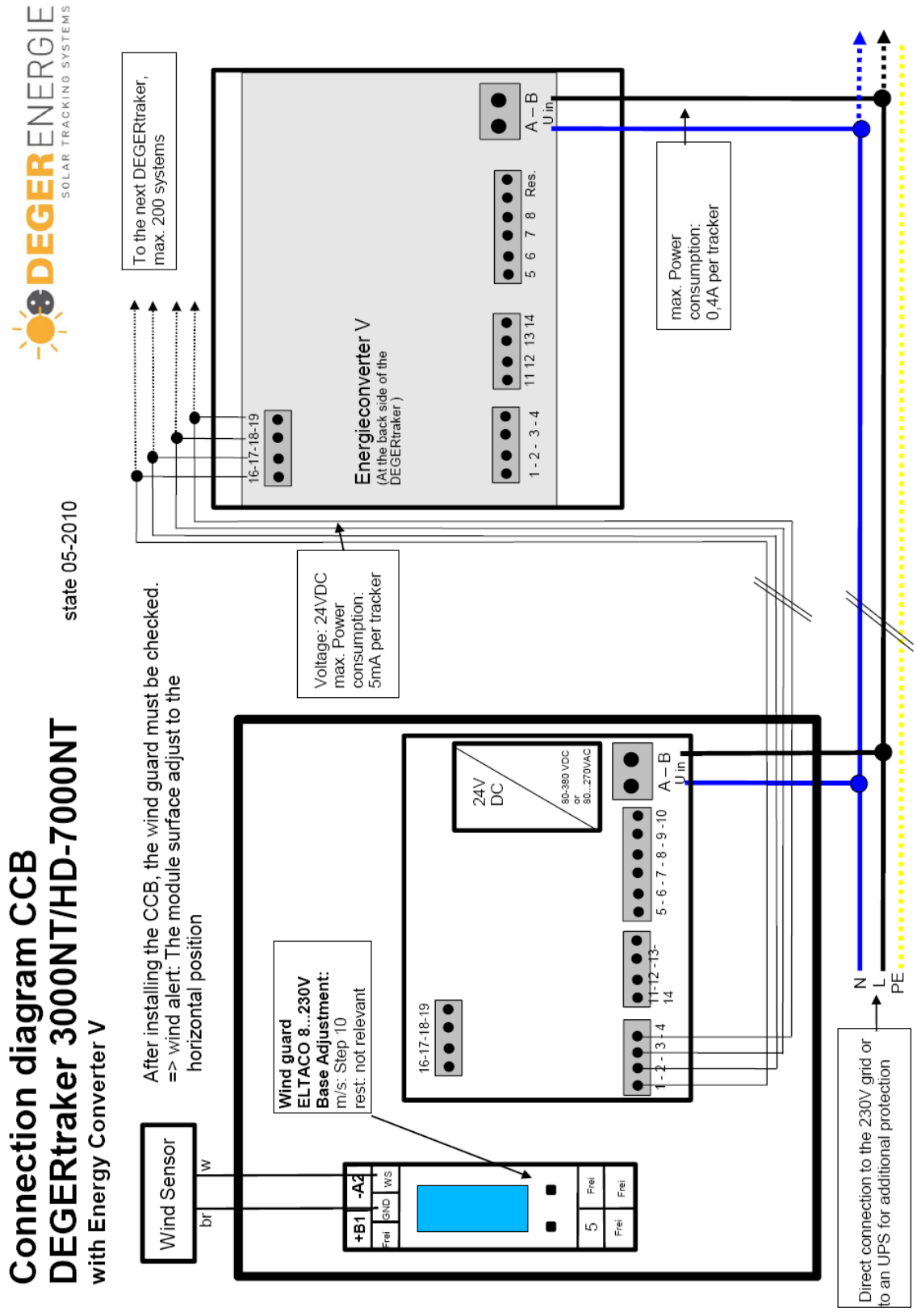
16-17: Input for selectiv switch circuit elevation axis (e.g. wind guard)

18-19: Input for selectiv switch circuit azimuth axis

The complete control unit in overview:



Part V – Control unit
Connection diagram CCB with energy converter V



Part V – Control unit
Windguard and CCB, Sunlight Sensor and Snow Sensor (optional)

Assembly Site for Windguard and CCB:

The windguard should be assembled at a point exposed to the wind, near the DEGERtraker above the upper edge of the module. An installation on the module surface is **not permitted**.

The Assembly location for the CCB can be freely selected – tough **not directly next to the inverter**. It is recommended to install the CCB at a well accessible location within a building.

Setting the Windguard:

The windguard is set to a value of 10 m/sec at the factory. Under no circumstances may this value be increased.
Changing this value automatically entails a complete loss of warranty for the entire system.

Feed Line to the Windguard:

Measurement lines are not to be laid in parallel to other electrical lines and are to be shielded as of a length of 10 meters (max. 30m), for example JY-ST-Y. It is not permitted to connect the shield of the cable to GND. Use terminal screws and moistureproof boxes for extension.

Installation of Sunlight Sensor (optional):

Install the sunlight sensor with the spire on top at a light exposed position. Please note that the sensor must not be shaded at any point during the day.

Function of Sunlight Sensor:

The Sunlight Sensor continuously measures the insolation. At less than 120W/m², for example on cloudy weather or twilight, the tracker will move into flat position.
With the switch “Sunlight Sensor ON/OFF” on the CCB, the Sunlight Sensor can become deactivated.

Installation of Snow Sensor (optional):

The Snow Sensor is automatically dropping snow away from the module surface. A detailed assembly instruction is appended to the Snow Sensor.

Declaration of Conformity

in accordance with EC machine directive 98/37/EG, addendum II A

for solar tracking systems

We,

DEGERenergie GmbH, 72160 Horb, Germany

herewith declare that the listed products in the way we put them in circulation destined for EC member countries are fitted with CE plates in accordance with EC machine directive.

Note:
This declaration will become invalid if the product is
- modified, supplemented or changed in any kind
- and/or accessories not from DEGERenergy are used
- and in case of inappropriate assembling or installation or not intended use/improper use without our express permission

marking of the systems:	DEGER**traker 3000NT, 3000HD, 5000NT, 5000HD, 7000NT**
EC-directives:	EC machine directive (98/37/EC) EC Low Voltage Directive 73/23/EEC) EC EMV directive (89/336/EWG) i.d.F. 93/31/EWG
Applied harmonised standards:	EN 60730-1:2000 EN 60730-1/A14:2005 EN 55011:1998 EN 61000-3-2:2000 EN 61000-3-3:1995 + A1:2001 EN 61000-6-2:2005 EN 50102
Applied national standards and technical specification:	VDE 0470-100,VDE 0875,E VDE 0530,DIN VDE 0470-1 DIN 42025 DIN 40050-2 DIN 1055-1 DIN 1055-4 DIN 18800 DIN 4149 (04/2005)

Horb, 21.05.2010

DEGERenergieGmbH , Artur Deger
- General Manager -

Part VI – Certificates
TÜV-certificate – DEGERtraker 5000NT and 7000NT

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

Product Service

C E R T I F I C A T E

No. Z1A 07 03 59165 001

Holder of Certificate: **DEGERenergie GmbH**
Tracking Systems
Steinshalde 56
72296 Schopfloch
GERMANY

Certification Mark:

Product: **Controllers**
Solar tracking system

The product meets the requirements of the German Equipment and Product Safety Act. The Certification marks shown above can be affixed on the product. The certification marks must not be altered in any way. The use of the GS-Mark is permitted until the listed date, the use of the TÜV-Mark is unlimited, unless it is cancelled. See also notes overleaf.

Test report no.: 71314674, 70119249

GS-Mark valid until: 2012-03-07

336612

Date, 2007-05-29

Page 1 of 2

TÜV SÜD Product Service GmbH · Zertifizierstelle · Ridlerstrasse 65 · 80339 München · Germany

Assembly Instruction
DEGERtraker

Part VI – Certificates
Declaration of commitment

DEGERtraker 3000NT, 3000HD
DEGERtraker 5000NT, 5000HD
DEGERtraker 7000NT
DEGERtraker 9000NT

DEGERenergie GmbH
Industriestrasse 70
72160 Horb
Telefon: +49 7451 53914-0
Fax: +49 7451 53914-10
E-mail: info@DEGERenergie.com

You have purchased a product that was submitted to careful examination prior to delivery. If, in spite of all our care, the system which you purchased and we delivered is defective, we will accept liability for defects to the following extent:

Liability for Defects

DEGERenergie GmbH undertakes to its contracting partner that it shall accept liability for defects as follows:
Contrary to the statutory two-year period for enforcing claims in respect of defects, the period granted for enforcing claims in respect of defects shall be extended to 5 years only when the start-up protocol is filled out completely and sent to DEGERenergie within 4 weeks of start up.
DEGERenergie guarantees an extended liability for defects specifically against rusting through for 20 years, applicable to the entire steel structure.
The compensation of exchange workings during the statutory warranty is exclusively based on the current version of the DEGERenergie time target indemnification which can be provided on demand.
This extended liability for defects shall apply only in respect of replacing the defective material, but not for any other costs, in particular the cost of labour.
In the event of any damage, DEGERenergie GmbH's contracting partner undertakes to notify said damage to DEGERenergie GmbH without delay.

Proof

DEGERenergie GmbH is only obligated to provide liability for defects to the contracting partner if the unit constituting the object of the complaint is returned to DEGERenergie GmbH together with a copy of the invoice issued to the contracting partner. The unit identification plate must be fully legible.

Conditions

The defective part is to be returned free of charge to DEGERenergie GmbH in its original packaging or, at the very least, in equivalent transportation packaging.
Insofar as the object of the contract exhibits a defect attributable to DEGERenergie GmbH, DEGERenergie GmbH shall be obligated to repair or exchange the defective part for a new part unless DEGERenergie GmbH is entitled to refuse to remedy the defect under the terms of the law. DEGERenergie GmbH's contracting partner must allow the latter a reasonable period of time in which to remedy the defect.
The repair or replacement of the defective part shall be free of charge for DEGERenergie GmbH's contracting partner.
The DEGERtraker 5000NT can be only started in combination with a suitable wind guard designed to move the solar module area into a horizontal position in the event of stormy weather. The contracting partner must guarantee that the wind guard is in place at all times and functions correctly.

Exclusion of liability

Open area systems: DEGERenergie GmbH is not liable for any extra costs (e.g. use of crane, skylift, etc.) that arise from using higher masts than the standard version of 3.3 m total mast length.
Building integration: DEGERenergie GmbH is not liable for any extra costs (e.g. use of crane, skylift, etc.) that arise from mounting masts to buildings.
DEGERenergie GmbH is furthermore not liable for any damage that arises as a consequence of improper operation by the contract partner, in particular if the module area is too generously dimensioned.
The respective specifications from the data sheet must be observed. DEGERenergie GmbH cannot accept any liability damage caused by over-dimensioning the module area.
The maximum mountable modulesurface depends on regional conditions and regulations. To calculate the maximum mountable modulesurface a dimensioning-tool is available on our website. The download of the dimensioning-tool is for free.
Neither can DEGERenergie GmbH accept liability for consequential damage caused by a defective tracking system.
DEGERenergie GmbH shall not be liable for:

- Defects due to improper use;
- Defects due to the insert of foreign components for example mounting profiles;
- Defects due to changes to the mechanics and/or electronics;
- Defects due to acts of God (lightning, over voltage, storm, fire, etc.);
- Defects due to a bigger modulesurface than calculated with the DEGER dimesioningtool (depends on region, height of the system, etc.);
- Defects due to interventions, changes, or attempted repairs;
- Defects due to non-compliance with the instructions in the assembly and connections guide.

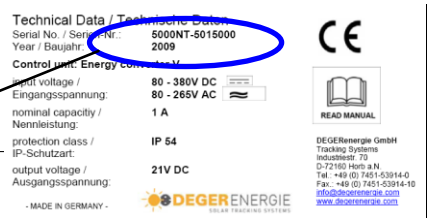
Our General Terms and Conditions for Deliveries and Services shall apply in all other respects, correct as of: September 2005.

Certificates - Report of implementing DEGERtraker

Type: ☐ DEGERtraker 3000NT ☐ DEGERtraker 3000HD ☐ DEGERtraker 5000NT
☐ DEGERtraker 5000HD ☐ DEGERtraker 7000NT ☐ DEGERtraker 9000NT

Operator: _____
(name, addres, Tel. of operator)

Installer/Planer: _____
(name, addres, Tel. of Installer/Planer)


Technical Data / Technische Daten:
Serial No. / Serien-Nr.: 5000NT-5015000
Year / Baujahr: 2009
Control unit: Energy Converter V
input voltage / Eingangsspannung: 80 - 380V DC 80 - 265V AC
nominal capacitiy / Nennleistung: 1 A
protection class / IP-Schutzart: IP 54
output voltage / Ausgangsspannung: 21V DC
- MADE IN GERMANY -
DEGERENERGIE
READ MANUAL
DEGERenergie GmbH
Tracking Systems
Industriestr. 70
D-72160 Horb a.N.
Tel.: +49 (0) 7451-53914-0
Fax.: +49 (0) 7451-53914-10
info@degerenergie.com
www.degerenergie.com

Date of implementing : _____
Amount: _____
Serial number(s): (ID-Code) _____
(please mention at least the last 7 numbers)

Assembley:

☐ free standing traker ☐ traker integrated in building ☐ total height _____m
(top edge module surface)

☐ standard-mast (3,30m) ☐ Mast extension_____m

Control of the assembly		O.K.	inplemen-ting	current
reinforcement of the foundation was build in due to the plan				
hole sphere of action is free of objects				
mechanic moves freely, cables are long enough				
bore holes for dewatering of the EL-motor on the lower side				
locking fluid EL-motor (Pos.8) is applied				
dimensions of module arrangement are abode				
symetrical arrangement of the modules to the center of gravity				
lightning protection and grounding is connected				
conecter East-West axle is mounted pointed upwards above the solar module surface				
conecter elevation axle is mounted laterally at the solar module surface				
Control of the function				
East-West drive rotates towards the brightest spot (cover one sensor cell)				
Elevation drive rotates towards the brightest spot (cover one sensor cell)				
activation by use of wind guard drives traker into horizontal position				
Measured data		**reference**		
Power supply	clamp A-B		V	V
Conecters:				
Power supply to conecter elevation	clamp 5-6	20-24V	V	V
Output from conecter elevation	clamp 11-12	20-24V	V	V
Power supply to conecter east-west	clamp 7-8	20-24V	V	V
Output from conecter east-west	clamp 13-14	20-24V	V	V
Motors:				
Power supply to motor elevation	clamp 1-2	20-24V	V	V
Power supply to motor east-west	clamp 3-4	20-24V	V	V
current consumption motor elevation		0,4-1,1A	A	A
current consumption motor east-west		0,4-1,1A	A	A

Date: _____
Signatures:

_____ _____
Installer/Planer Operator

IMPORTANT INSTRUCTIONS!!

The Report of implementing should be filled out on initial operation and faxed to the company DEGERenergie within 4 weeks of implementation. Fax-No. +49 7451 5391410
The entitlement to warranty claims for material defects will be only be extended from the statutory two-year period warranty to 5 years if this protocol is submitted within the specified timeframe.

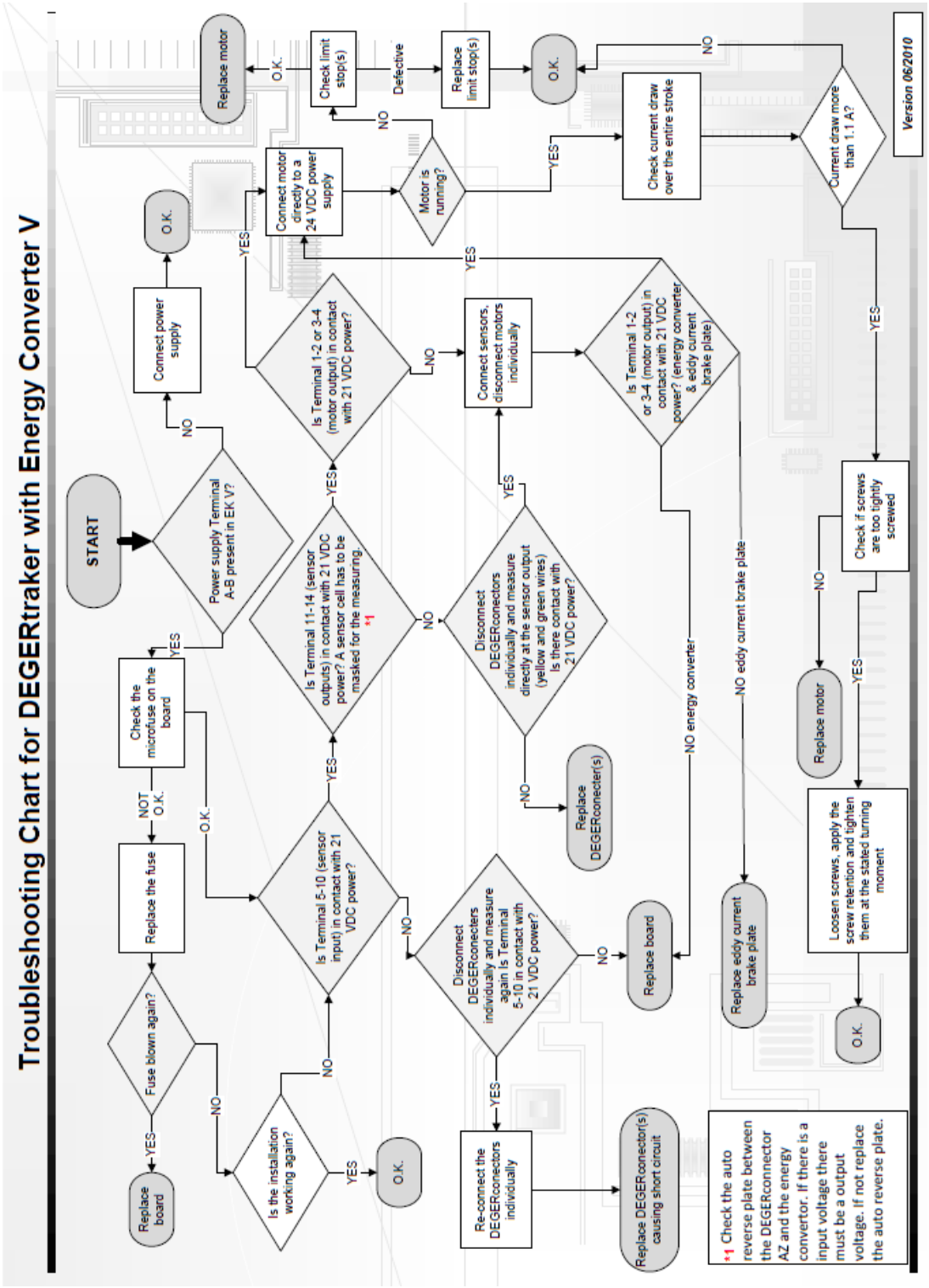
Assembly Instruction
DEGERtraker

Part VI - Certificates
List of tracking systems

No.	Position	Serial-No.	No.	Position	Serial-No.	No.	Position	Serial-No.

Part VII – Trouble shooting / Maintenance
Trouble Shooting

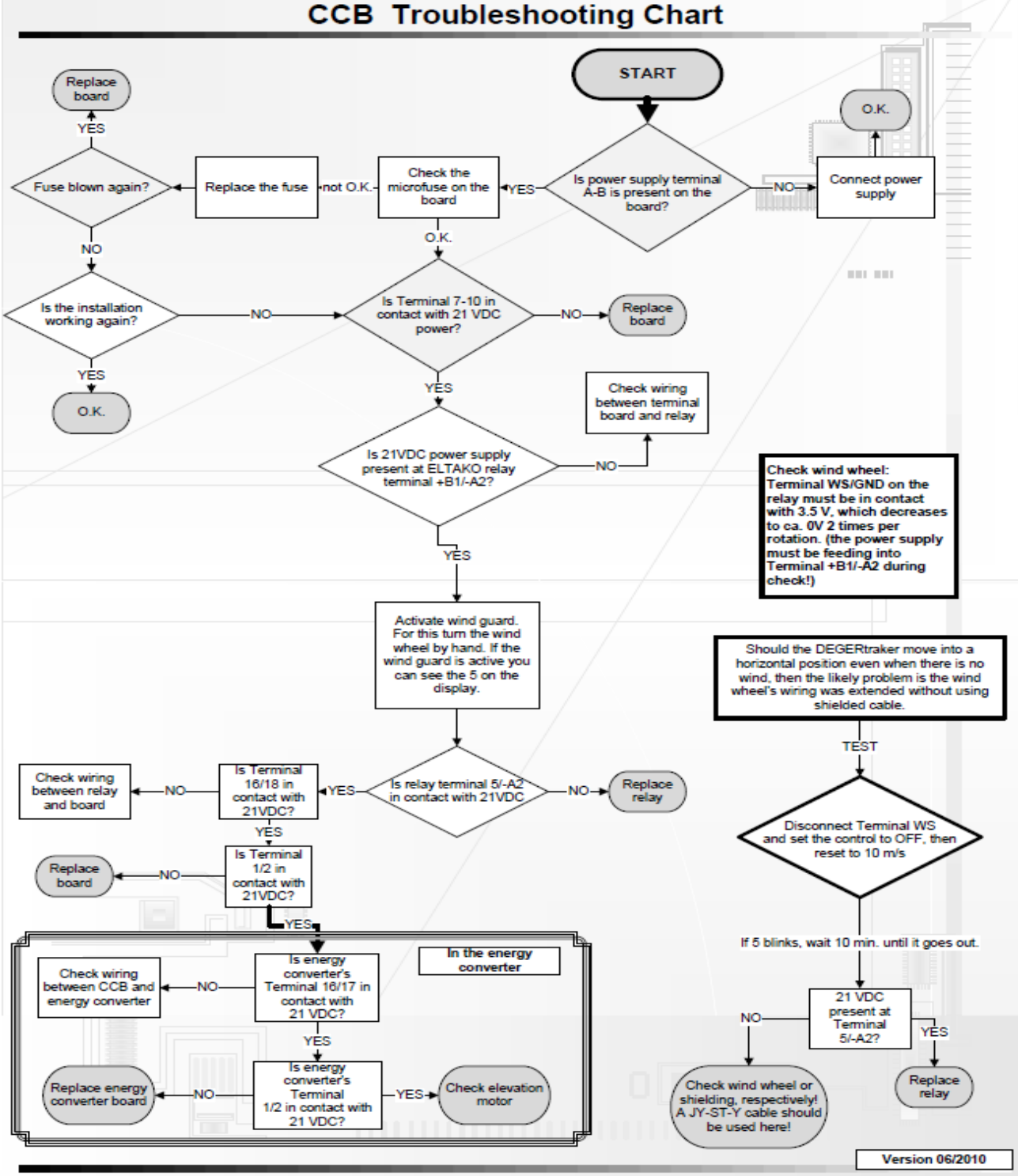
Precondition for trouble shooting:
The DEGERtraker has been assembled step by step as in the assembly instruction described


Troubleshooting Chart for DEGERtraker with Energy Converter V
START
Power supply Terminal A-B present in EK V?
Connect power supply
O.K.
Check the microfuse on the board
Replace the fuse
Fuse blown again?
Replace board
Is the installation working again?
O.K.
Is Terminal 11-14 (sensor outputs) in contact with 21 VDC power? A sensor cell has to be masked for the measuring. *1
Is Terminal 5-10 (sensor input) in contact with 21 VDC power?
Disconnect DEGERconectors individually and measure again Is Terminal 5-10 in contact with 21 VDC power?
Re-connect the DEGERconectors individually
Replace DEGERconector(s) causing short circuit
Disconnect DEGERconectors individually and measure directly at the sensor output (yellow and green wires) Is there contact with 21 VDC power?
Replace DEGERconecter(s)
Is Terminal 1-2 or 3-4 (motor output) in contact with 21 VDC power?
Connect sensors, disconnect motors individually
Is Terminal 1-2 or 3-4 (motor output) in contact with 21 VDC power? (energy converter & eddy current brake plate)
NO energy converter
NO eddy current brake plate
Replace eddy current brake plate
Replace board
Connect motor directly to a 24 VDC power supply
Motor is running?
Check limit stop(s)
Defective
Replace limit stop(s)
O.K.
Replace motor
Check current draw over the entire stroke
Current draw more than 1.1 A?
Check if screws are too tightly screwed
Loosen screws, apply the screw retention and tighten them at the stated turning moment
O.K.
Replace motor
*1 Check the auto reverse plate between the DEGERconnector AZ and the energy convertor. If there is a input voltage there must be a output voltage. If not replace the auto reverse plate.
Version 06/2010

The application of the troubleshooting plan presented above enables a target-oriented troubleshooting.

To exchange defective parts, please contact us with the fault report located in these assembly istructions. We will promptly ship you the necessary replacement parts including detailed exchange instructions.

Part VII – Trouble shooting / Maintenance
Trouble Shooting CCB


CCB Troubleshooting Chart
START
Is power supply terminal A-B is present on the board?
YES
NO
O.K.
Connect power supply
Check the microfuse on the board
not O.K.
Replace the fuse
Fuse blown again?
YES
NO
Replace board
O.K.
Is the installation working again?
NO
YES
O.K.
Is Terminal 7-10 in contact with 21 VDC power?
NO
YES
Replace board
Check wiring between terminal board and relay
Is 21VDC power supply present at ELTAKO relay terminal +B1/-A2?
NO
YES
Check wind wheel: Terminal WS/GND on the relay must be in contact with 3.5 V, which decreases to ca. 0V 2 times per rotation. (the power supply must be feeding into Terminal +B1/-A2 during check!)
Activate wind guard. For this turn the wind wheel by hand. If the wind guard is active you can see the 5 on the display.
Should the DEGERtraker move into a horizontal position even when there is no wind, then the likely problem is the wind wheel's wiring was extended without using shielded cable.
TEST
Is relay terminal 5/-A2 in contact with 21VDC
NO
YES
Replace relay
Is Terminal 16/18 in contact with 21VDC?
NO
YES
Check wiring between relay and board
Disconnect Terminal WS and set the control to OFF, then reset to 10 m/s
Is Terminal 1/2 in contact with 21VDC?
NO
YES
Replace board
If 5 blinks, wait 10 min. until it goes out.
In the energy converter
Is energy converter's Terminal 16/17 in contact with 21 VDC?
NO
YES
Check wiring between CCB and energy converter
21 VDC present at Terminal 5/-A2?
NO
YES
Replace relay
Is energy converter's Terminal 1/2 in contact with 21 VDC?
NO
YES
Replace energy converter board
Check elevation motor
Check wind wheel or shielding, respectively! A JY-ST-Y cable should be used here!
Version 06/2010

The application of the troubleshooting plan presented above enables a target-oriented troubleshooting.

To exchange defective parts, please contact us with the fault report located in these assembly istructions. We will promptly ship you the necessary replacement parts including detailed exchange instructions.

Assembly Instruction DEGERtraker

Part VII – Trouble shooting / Maintenance
Maintenance

The DEGERtraker 3000NT / 3000HD / 5000NT / 5000HD / 7000NT / 9000NT is designed for as less as possible service- and maintenance work to do. For a safe and long-life running of the system it is necessary to do the following jobs periodically once a year:

- control all screws and tighten them up to the torque given in the assembly instruction.

Mounting screw Dimensions	Tightening torque M_A[1)] in Nm screw strength class
M6	7.8
M8	19.1
M10	38.0
M12	66.5
M14	107.0
M16	168.0

1) M_A according to VDI-guideline 2230 (Feb. 2003) for μ_A=0.08 and μ_B=0.12

- Control all moving parts and lubricate them again if necessary. Pay special attention to the IMO.
- For this you can find some lubricate nipples at the IMO and at the bolt M24 (Fixation base frame).
- You find recommended lubricants in the list below.

Addapted Lubricants for DEGERtraker 3000NT / 3000HD / 5000NT / 5000HD / 7000NT / 9000NT:

Supplier	Product name	Art.-Nr.	Applicable temperature range
Klüber	Klüberbio® M72-82	6800009	-40 °C until +140 °C

Warning!!
The systems are filled up ex works with enviromental friendly grease, which is not mixable with other greases.

That **Klüberbio Fett M72-82** can be obtained by DEGERenergie.

Protocols – Fault report DEGERtraker

To assist in case of problems with our systems it is necessary to have this fault report on hand.
Without a completely filled out fault report there can not be any support provided!!
Please send this report to the following fax number: +49 7451 5391410
or scan and email to: service@degerenergie.com
Please provide a phone number to contact you.
RECALL-NUMBER: _____ (required)

Fault report from ___.___._____

1 Information about System

- ☐ TOPtraker 6.1 (from 2002)
- ☐ TOPtraker 8.5 (from 4/2008)
- ☐ TOPtraker 25HD (from 2008)
- ☐ TOPtraker 40NT (from 2008)
- ☐ 300EL (1999 to 2010)
- ☐ 1000/1200EL (1999 to 2002)
- ☐ 1600EL (2002 to 3/2008)
- ☐ 2500EL (2003 to 2005)
- ☐ 4000EL (until 2006)
- ☐ 3000NT (from 3/2008)
- ☐ 5000NT (from 10/2005)
- ☐ 7000NT (from 8/2006)
- ☐ 9000NT (from 8/2010)
- ☐ 3000HD (from 5/2008)
- ☐ 5000HD (from 5/2008)
- ☐ 3000CT (from 1/2010)
- ☐ 5000CT (from 1/2010)

_____ Date if delivery	☐ Individual DEGERtraker ☐ Plant with Tracker	_____ Serial number(s)	
Energiekonverter-Typ: ☐ I ☐ II ☐ III ☐ V	Windguard-Typ: ☐ ELTAKO ☐ ELERO ☐ CCB I ☐ CCB II	Power-Supply-Energiekonverter Value: V, ☐ AC, ☐ DC	
Assembly: ☐ free standing ☐ integrated in building		Total high (top edge modulsurface over ground) m	

2 Measurement

Control of function			
East-West drive rotates to the brightest spot (cover one sensor cell)			☐
Elevation drive go to the brightest spot (cover one sensor cell)			☐
By activated wind guard the DEGERtraker go into horizontal position			☐
Measured data at the Energiekonverter		**Soll**	
Power supply	clamp A-B		V
DEGERconecters:			
Power supply to DEGERconecter elevation	clamp 5-6	20-24V	V
Output from DEGERconecter elevation	clamp 11-12	20-24V	V
Power supply to DEGERconecter east-west	clamp 7-8	20-24V	V
Output from DEGERconecter east-west	clamp 13-14	20-24V	V
Motors:			
Power supply to motor elevation	clamp 1-2	20-24V	V
Power supply to motor east-west	clamp 3-4	20-24V	V
Current consumption motor elevation		0,4-1,1A	A
Current consumption motor east-west		0,4-1,1A	A

To give you a quick help this form filled out is required. Without a complete filled out form the processing of complaints is not possible. For guarantee a copy of delivery note is required additional.
Send the filled out form to: service@degerenergie.com or by Fax: +49 7451 53914-10 to DEGERenergie.
You will be contacted from us. Thank you for your help.

3 Data

Contact
☐ Distributor ☐ Installer ☐ Operator

_____ Company / location

_____ Adress

_____ ZIP Code / location

_____ Contact person

Adress of spare parts:

DEGERenergie GmbH
- Service -
Industriestrasse 70
72160 Horb a.N.

4 Formulation of Problem

_____

5 Spare-Part(s) with Number

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